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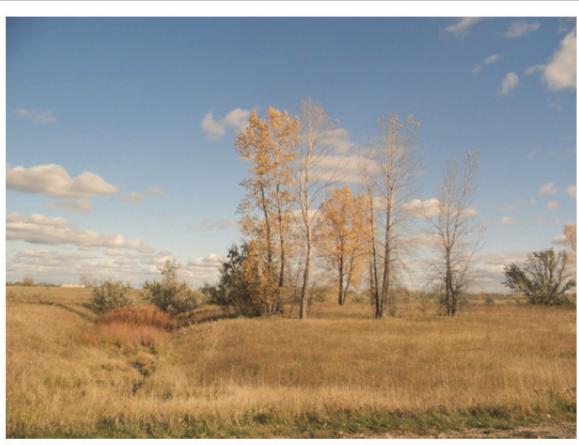
**ENVIRONMENTAL ASSESSMENT**

**ADDRESSING THE**

**INTEGRATED CONTROL OF NUISANCE SPECIES**

**AT**

**GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**



**APRIL 2013**

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**FINAL**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI) and Finding of No  
Practicable Alternative (FONPA)**

**Environmental Assessment  
Addressing the Integrated Control of Nuisance Species  
at  
Grand Forks Air Force Base, North Dakota**

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**Introduction**

Federal actions that potentially involve significant impacts on the environment must be reviewed in accordance with the National Environmental Policy Act (NEPA) and all other applicable laws mandated by the Council on Environmental Quality (CEQ). In accordance with NEPA and the CEQ, the United States Air Force (USAF) has completed an Environmental Assessment (EA) to address the implementation of all phases of an integrated nuisance species control program. The integrated pest management program (IPMP) includes implementing the Mosquito Management Plan (MMP) and expanding herbicide applications to eradicate noxious and invasive weed species at Grand Forks Air Force Base (AFB), North Dakota. This will enable personnel to perform necessary activities to successfully meet the USAF mission. The EA, upon which this FONSI/FONPA is based, is attached.

**Purpose of and Need for the Proposed Action**

The purpose of the Proposed Action is to reduce mosquito and noxious plant populations through compliance with the Integrated Natural Resources Management Plan (INRMP); MMP; IPMP; Executive Order (EO) 13112, *Invasive Species and the Federal Noxious Weed Act*; and Federal and state regulations by applying appropriate techniques to manage and control mosquitoes and noxious and invasive weed species to improve the quality of the human and natural environment at Grand Forks AFB and the surrounding area.

The need for the Proposed Action is to control and reduce the effects of mosquitoes on the human environment. There is a need to sustain efforts to reduce the threat of a mosquito-borne disease outbreaks, and to continue providing a functional and effective environment for outdoor activities in support of the Grand Forks mission.

Weed control is necessary at Grand Forks AFB for overall aesthetics, safety (e.g., weeds can interfere with visibility for road users and obscure traffic signs), and structural integrity (weed growth can destroy paving surfaces, cause uneven slabs and broken tarmac, and crack walls, increasing maintenance costs). Additionally, weed control is required to comply with the INRMP, public law, and to manage grassland and wetland habitats.

**Description of the Proposed Action**

Under the Proposed Action, appropriate techniques will be applied to manage and control mosquitoes and noxious and invasive weed species to improve the quality of the human and natural environment at Grand Forks AFB and the surrounding area. Mosquito control will be conducted in an integrated manner by combining ground and aerial spraying, source reduction (e.g., removal of standing water for breeding and hatching activities), setting traps, and introducing predators or parasites. Chemical noxious weed control is proposed to be expanded, and chemical, biological, and operational controls are proposed as well.

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Grand Forks AFB will implement an IPMP for mosquito control on the installation, including use of techniques as discussed in the MMP. The MMP includes education, and surveillance and monitoring of mosquito populations and species, and physical, chemical, and biological controls. Physical controls include methods such as removing areas that collect standing water and maintaining drainage ditches, chemical controls include ground or aerial spraying of pesticides, and biological controls include the introduction of predators or parasites. The attached EA analyzes the impact of implementing the MMP on the human and natural environment.

Controlling noxious weeds and other invasive vegetation species includes mechanical control, or the physical removal of the undesired plant; biological control, or the use of other species that consume and eventually kill the undesired plants; cultural control, or the use of various landscaping practices that cause poor growing conditions for the undesired species, and chemical controls that include conducting herbicide spraying using ground-control methods. All installation areas are subject to DoD-approved herbicide applications. Areas in improved vegetated areas (1,309 acres) are frequently infested by dandelions, clover, and thistles. Improved pavement areas that include parking lots, roads, and sidewalks often have crack grass that requires control to maintain surface pavements. The semi-improved and unimproved areas (4,464 acres) of the installation host invasive and noxious weeds such as leafy spurge, Canada thistle, musk thistle, absinth wormwood, and spotted knapweed. Herbicides, mechanical methods, and biological controls are all techniques that could be employed on the prairies and grasslands of the semi-improved and unimproved areas. Some herbicide application or mechanical control will be required along the embankments of the wastewater lagoons east of the installation, and also to control infestations of weeds along ditches or within or adjacent to wetlands.

## **Summary of Anticipated Environmental Impacts**

The Proposed Action has been reviewed in accordance with NEPA as implemented by the regulations of the CEQ. The public and regulatory agency scoping process focused the analyses on the following environmental resources: land use, air quality, geological resources, water resources, biological resources, and safety. The Proposed Action will not result in significant impacts. Details of the environmental consequences can be found in the attached EA.

## **Conclusions**

### ***Finding of No Practicable Alternative.***

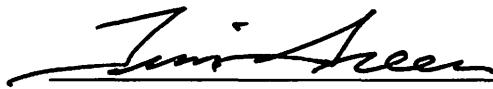
Pursuant to EO 11990, *Protection of Wetlands*, it is USAF policy to avoid conducting ground-disturbing activities within areas containing wetlands and other waters of the United States, where practicable. The Proposed Action will require ground-disturbing activities within wetland areas during drainage ditch maintenance. Some drainage ditches could be considered wetlands by the USACE if they have not been regularly maintained to preserve drainage ditch features. Therefore, implementation of the Proposed Action will result in direct impacts on these wetlands. Because of the nature of the Proposed Action, direct adverse impacts cannot be avoided on wetlands.

Effects on wetlands will not be significant and will be reduced to the maximum extent practicable through project design, following guidance specified in the INRMP, and implementation of environmental protection measures and construction best management practices as described in EA will occur. Any necessary agency coordination and required permits will be acquired prior to commencing any groundbreaking construction activities.

Portions of the Proposed Action also involve activities in a floodplain. I find that there is no practicable alternative to this action and that the Proposed Action includes all practicable measures to minimize impacts to floodplains and wetlands pursuant to EO 11988, EO 11990, the authority delegated by Secretary of the Air Force Order 791.1, *Environment*, and in consideration of the findings of the EA,

which is incorporated herein by reference. This decision has been made after taking into account all submitted information, and considering a range of reasonable alternatives that will meet project requirements and are within the legal authority of the USAF.

**Finding of No Significant Impact.** Based on the information and analysis presented in the attached EA, conducted in accordance with the requirements of the NEPA, the CEQ regulations, USAF implementing regulations set forth in 32 Code of Federal Regulations Part 989, *Environmental Impact Analysis Process* as amended, and review of the agency comments submitted during the comment period, I conclude that implementation of the Proposed Action will not result in significant impacts on the quality of the human or natural environment. For these reasons, a FONSI/FONPA is approved and preparation of an Environmental Impact Statement is not warranted. This decision has been made after taking into account all submitted information, and considering a range of reasonable alternatives that will meet project requirements and are within the legal authority of the USAF.



TIMOTHY S. GREEN  
Brigadier General, USAF  
Director of Installations and Mission Support



Date

Enclosure: *Environmental Assessment for Integrated Control of Nuisance Species at Grand Forks AFB, North Dakota*

*ACRONYMS AND ABBREVIATIONS*

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter	EIAP	Environmental Impact Analysis Process
2,4-D	2,4-Dichlorophenoxy-acetic acid	EIS	Environmental Impact Statement
319 CES	319th Civil Engineer Squadron	EISA	Energy Independence and Security Act
319 ABW	319th Air Base Wing	ELG	Effluent Limitations Guidelines
A.I.	active ingredient	EO	Executive Order
ACHP	Advisory Council on Historic Preservation	ESCP	Erosion and Sediment Control Plan
AFB	Air Force Base	FEMA	Federal Emergency Management Agency
AFI	Air Force Instruction	FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
AFPD	Air Force Policy Directive	FIRM	Flood Insurance Rate Map
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health	FPPA	Farmland Protection Policy Act
ATV	all-terrain vehicle	FONPA	Finding of No Practicable Alternative
AQCR	Air Quality Control Region	FONSI	Finding of No Significant Impact
AS	Airlift Squadron	FR	Federal Register
AW	Airlift Wing	ft <sup>2</sup>	square feet
BASH	bird/wildlife aircraft strike hazard	FY	fiscal year
bgs	below ground surface	GFMCD	City of Grand Forks Mosquito Control District
BMP	best management practice	GHG	greenhouse gas
Bt	<i>Bacillus thuringiensis</i>	GIS	geographic information systems
Bti	<i>Bacillus thuringiensis israelensis</i>	gpm	gallons per minute
C&D	construction and development	HAP	hazardous air pollutant
CAA	Clean Air Act	IGR	insect growth regulator
CDC	Centers for Disease Control	IICEP	Intergovernmental and Interagency Coordination for Environmental Planning
CEQ	Council on Environmental Quality	INRMP	Integrate Natural Resources Management Plan
CFR	Code of Federal Regulations	IPM	integrated pest management
CO	carbon monoxide	IPMP	Integrated Pest Management Plan
CO <sub>2</sub>	carbon dioxide	LC50	lethal concentration 50
CWA	Clean Water Act	LID	low impact development
DHS	U.S. Department of Homeland Security	<i>continued on inside of back cover →</i>	
DoD	Department of Defense		
DoDI	Department of Defense Instruction		
EA	Environmental Assessment		

*← continued from inside of front cover*

MCPA	2 Methyl-4-Chlorophenoxyacetic Acid	Pb	lead
MFH	military family housing	PGP	piperonyl butoxide
mg/m <sup>3</sup>	milligrams per cubic meters	P.L.	Pesticide General Permit
MMP	Mosquito Management Plan	PM <sub>10</sub>	Public Law
MSA	Munitions Storage Area	PM <sub>2.5</sub>	particulate matter equal or less than 10 microns in diameter
MSDS	Material Safety Data Sheet	ppb	particulate matter equal or less than 2.5 microns in diameter
MSL	mean sea level	PPE	parts per billion
NAAQS	National Ambient Air Quality Standards	ppm	personal protective equipment
NCOIC	Non-Commissioned Officer in Charge	PSD	parts per million
NDAQS	Non-Dakota Ambient Air Quality Standards	QD	prevention of significant deterioration
NDGFD	North Dakota Game and Fish Department	ROI	quantity-distance
NDNHP	North Dakota Natural Heritage Program	SDWA	region of influence
NDDH	North Dakota Department of Health	SHPO	Safe Drinking Water Act
NDDH/DWQ	North Dakota Department of Health/Division of Water Quality	SIP	State Historic Preservation Office
NEPA	National Environmental Policy Act	SO <sub>2</sub>	State Implementation Plan
NO <sub>2</sub>	nitrogen dioxide	SSPP	sulfur dioxide
NOA	Notice of Availability	SWPPP	Strategic Sustainability Performance Plan
NO <sub>x</sub>	nitrogen oxide	TMDL	Storm Water Pollution Prevention Plan
NPDES	National Pollutant Discharge Elimination System	tpy	total maximum daily load
NRCS	Natural Resources Conservation Service	UFC	tons per year
NWI	National Wetlands Inventory	ULV	Unified Facilities Criteria
NWR	National Wildlife Refuge	U.S.C.	ultra-low volume
O <sub>3</sub>	ozone	USACE	United States Code
O&M	operation and maintenance	USAF	U.S. Army Corps of Engineers
OP	organophosphate	USDA	U.S. Air Force
OSHA	Occupational Safety and Health Administration	USEPA	U.S. Department of Agriculture
		USFWS	U.S. Environmental Protection Agency
		VOC	Agency
		WMA	U.S. Fish and Wildlife Service
		YARS	volatile organic compound
			Wildlife Management Area
			Youngstown Air Reserve Station



## COVER SHEET

### **FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING THE INTEGRATED CONTROL OF NUISANCE SPECIES AT GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

**Responsible Agencies:** U.S. Air Force (USAF), Headquarters Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois; and Grand Forks AFB, North Dakota.

**Affected Location:** Grand Forks AFB.

**Proposed Action:** Implementation of integrated control of nuisance species program to eradicate mosquitoes and noxious and invasive weed species.

**Report Designation:** Draft Environmental Assessment (EA).

**Abstract:** The purpose of the Proposed Action is to implement all phases of the integrated mosquito management program, including the newly adopted Mosquito Management Plan (MMP) and expand herbicide applications for noxious and nuisance weed control at Grand Forks AFB to enable personnel to perform activities necessary to successfully meet the USAF mission.

Under the No Action Alternative, the MMP would not be implemented and herbicide applications for noxious weeds would not be expanded. Although the plan would not be implemented, the control measures currently being used on the installation would continue. There would be no change from existing conditions at the installation.

The EA has been prepared to evaluate the Proposed Action and the No Action Alternative. Resources considered in the impacts analysis include land use, air quality, geological resources, water resources, biological resources, and safety. The Draft EA will be made available to the public upon completion.

All comments and inquiries regarding this document should be submitted in writing to the Public Affairs Office, 319th Air Base Wing, 701 Eielson Street, Building 607, Room 211, Grand Forks Air Force Base, North Dakota 58205. Questions regarding this document can also be directed to the Public Affairs Office via telephone by calling 701-747-5023 or by email addressed to [PublicAffairsOfficeGrandForksAFB@us.af.mil](mailto:PublicAffairsOfficeGrandForksAFB@us.af.mil). Copies of this document can be viewed at three local libraries (Grand Forks Library at 2110 Library Circle, Grand Forks, North Dakota 58201; East Grand Forks Campbell Library at 422 4th Street NW, East Grand Forks, Minnesota 56127; and Grand Forks AFB Library at 511 Holzapple Street, Grand Forks AFB, North Dakota 58205) or they can be viewed at the following Web site: <http://www.grandforks.af.mil/library/>. Anyone wishing to view the supporting documents for this action should contact the Public Affairs Office at 701-747-5023.



*FINAL*

**ENVIRONMENTAL ASSESSMENT  
ADDRESSING THE  
INTEGRATED CONTROL OF NUISANCE SPECIES  
AT  
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

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**319 CIVIL ENGINEER SQUADRON  
GRAND FORKS AIR FORCE BASE  
NORTH DAKOTA 58205-6434**

**APRIL 2013**



**FINAL  
ENVIRONMENTAL ASSESSMENT ADDRESSING THE  
INTEGRATED CONTROL OF NUISANCE SPECIES  
AT  
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

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## 1. Purpose of and Need for the Proposed Action

This Environmental Assessment (EA) has been prepared to describe and analyze the Grand Forks Air Force Base (AFB) Proposed Action to implement the Mosquito Management Plan (MMP) as part of the mosquito management program and to expand herbicide applications to eradicate noxious and invasive weed species.

### 1.1 Background

The 319th Civil Engineer Squadron (319 CES) at Grand Forks AFB proposes to complete the U.S. Air Force (USAF) Environmental Impact Analysis Process (EIAP) to determine the potential environmental impacts associated with integrated nuisance species control. For mosquitoes, proposed control includes trapping mosquitoes, aerial and ground spraying to control mosquitoes, and habitat source reduction. For noxious and invasive plant species, ground-spraying of herbicides is proposed.

**Mosquitoes.** Mosquito populations can cause discomfort, stress, pain, suffering, and illness from the spread of diseases, including the West Nile virus. *Culex* and *Aedes* mosquitoes transmit West Nile Virus; Grand Forks AFB has an abundance of *Aedes vexans*, a common nuisance mosquito. Aircraft maintenance personnel, security forces, fire department employees, and others who work outdoors could be adversely affected when the mosquito population is high. While each individual's predisposition to mosquito bites varies, morale and productivity are generally adversely impacted during periods of high mosquito activity. Intense mosquito activity causes a decline in installation personnel using outdoor recreation facilities such as the golf course, athletic fields, playgrounds, and picnic areas. The overall effect of this decline can result in reduced productivity and negative morale for assigned personnel and their dependents and residents of the civilian communities.

The USAF conducts aerial spraying of pesticides nationwide to control adult and larval forms of mosquitoes at military installations and their surrounding communities. These applications are performed in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); (Public Law [P.L.] 75-717) 7 United States Code [U.S.C.] Section 136 et seq.; the Department of Defense Instruction (DoDI) 4150.07, *DOD Pest Management Program*, May 29, 2008; and applicable state pesticide regulations. The current mosquito management program used at Grand Forks AFB incorporates aerial treatment, ground spraying, and larvicide (GFAFB 2003a). Updated National Environmental Policy Act (NEPA) analysis is required to implement an integrated mosquito control program as is discussed in the MMP.

The Pest Management Shop invests a majority of available labor resources and time to manage mosquito populations on Grand Forks AFB. Trapping is conducted on an occasional basis using mosquito magnet traps and Centers for Disease Control (CDC) light traps. Traps on Grand Forks AFB are currently regulated by the Bioenvironmental Engineering Flight.

In the spring (usually May), after post-larval dipping has been conducted to determine the need and type of larvicide measures, the shop begins larvicide with Altosid® briquettes and pellets. The briquettes are applied once per season to permanent water features and provide larvicide control for up to 150 days. If the presence of larvae is detected, Altosid® pellets are applied to intermittent water bodies including puddles or other appropriate areas after storm events. The Altosid® pellets are active for 30 days. The shop begins the adulticide control program once the mosquito trap count reaches 100 for Grand Forks AFB, or if there is clear visual evidence and field reports that indicate high mosquito activity. The traps are issued and operated by the Public Health Flight.

To apply adulticide, the Pest Management Shop fogs using Curtis Dyna Fog – Maxi-Pro 4 equipment three times a week. The synthetic pyrethroids Anvil®, Kontrol 4-4, and Duet™ are proposed for fogging efforts in the future. Fogging efforts continue until mosquito activity is reduced in the fall (i.e., October

or September) and below the threshold count of 100 mosquitoes per trap. If mosquito activity is abnormally high in a given year, the Pest Management Shop can also treat resting areas, such as shelterbelt trees. In residential areas, 10 mosquito magnets are used to attract and trap mosquitoes. The primary species to be controlled are *Aedes vexans*, *Aedes dorsalis*, *Aedes spencerii*, *Ochlerotatus flavescentis*, *Culiseta inornata*, and *Culex tarsalis*. Larvicides are also applied to smaller areas on installation.

**Noxious and Invasive Weeds.** Grand Forks AFB has conducted ground spraying of herbicides to control noxious and invasive weeds and to assist in restoring native habitats. The Federal Noxious Weed Act (7 U.S.C. 2814) and North Dakota Law 4.1-47-02 require the management and control of noxious weeds. Grand Forks AFB has determined that the preferred method of weed control has been the use of ground-based methods (i.e., manual and mechanical) to reduce potential aerial herbicide spray drift that could result in damage to surrounding on- and off-installation agricultural vegetation and crops. Past experience has shown that aerial spraying of herbicides can be prone to hazardous herbicide spray drift, and, as such, it is not a recommended activity for Grand Forks AFB. Other methods of weed control should be sought to control noxious and invasive weeds when difficult field conditions exist and include efforts like bulldozing, all-terrain vehicle (ATV) mowing and spraying, burning, and revegetation.

## 1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to reduce mosquito and noxious plant populations through compliance with the Integrated Natural Resources Management Plan (INRMP)(GFAFB 2011); MMP (GFAFB 2012); Integrated Pest Management Plan (IPMP) (GFAFB 2007a); Executive Order (EO) 13112, *Invasive Species and the Federal Noxious Weed Act*; and Federal and state regulations by applying appropriate techniques to manage and control mosquitoes and noxious and invasive weed species to improve the quality of the human and natural environment at Grand Forks AFB and the surrounding area.

The need for the Proposed Action is to control and reduce the effects of mosquitoes on the human environment. There is a need to sustain efforts to reduce the threat of mosquito-borne disease outbreaks and to continue providing a functional and effective environment for outdoor activities in support of the Grand Forks mission.

Weed control is necessary at Grand Forks AFB for overall aesthetics, safety (e.g., weeds can interfere with visibility for road users and obscure traffic signs), and structural integrity (weed growth can destroy paving surfaces, cause uneven slabs and broken tarmac, and crack walls, increasing maintenance costs). Additionally, weed control is required to comply with the INRMP, public law, and to manage grassland and wetland habitats (GFAFB 2011).

## 1.3 Location

Grand Forks AFB is a USAF installation under the AMC. The 319th Air Base Wing (319 ABW), which serves as the host wing, provides installation operational support to wing personnel, three tenant units, and nine Geographically Separated Units. Grand Forks AFB trains, deploys, and redeploys more than 1,300 airmen in support of the Air Expeditionary Force and combatant commander requirements. Grand Forks AFB provides facilities and equipment support for the U.S. Department of Homeland Security (DHS), U.S. Customs and Border Protection, and the 69th Reconnaissance Group. Grand Forks AFB also provides logistical, medical, civil engineering, contracting, communications, security, and force support; and houses facilities and equipment valued at \$2.2 billion and executes a budget of \$48 million. Tenants on Grand Forks AFB include the Air Force Audit Agency, the U.S. Army Corps of Engineers (USACE), and the DHS. The installation is in Grand Forks County near the North Dakota-Minnesota state boundary, north of and adjacent to the City of Emerado, and is 15 miles west of the City of Grand Forks (see **Figure 1-1**).

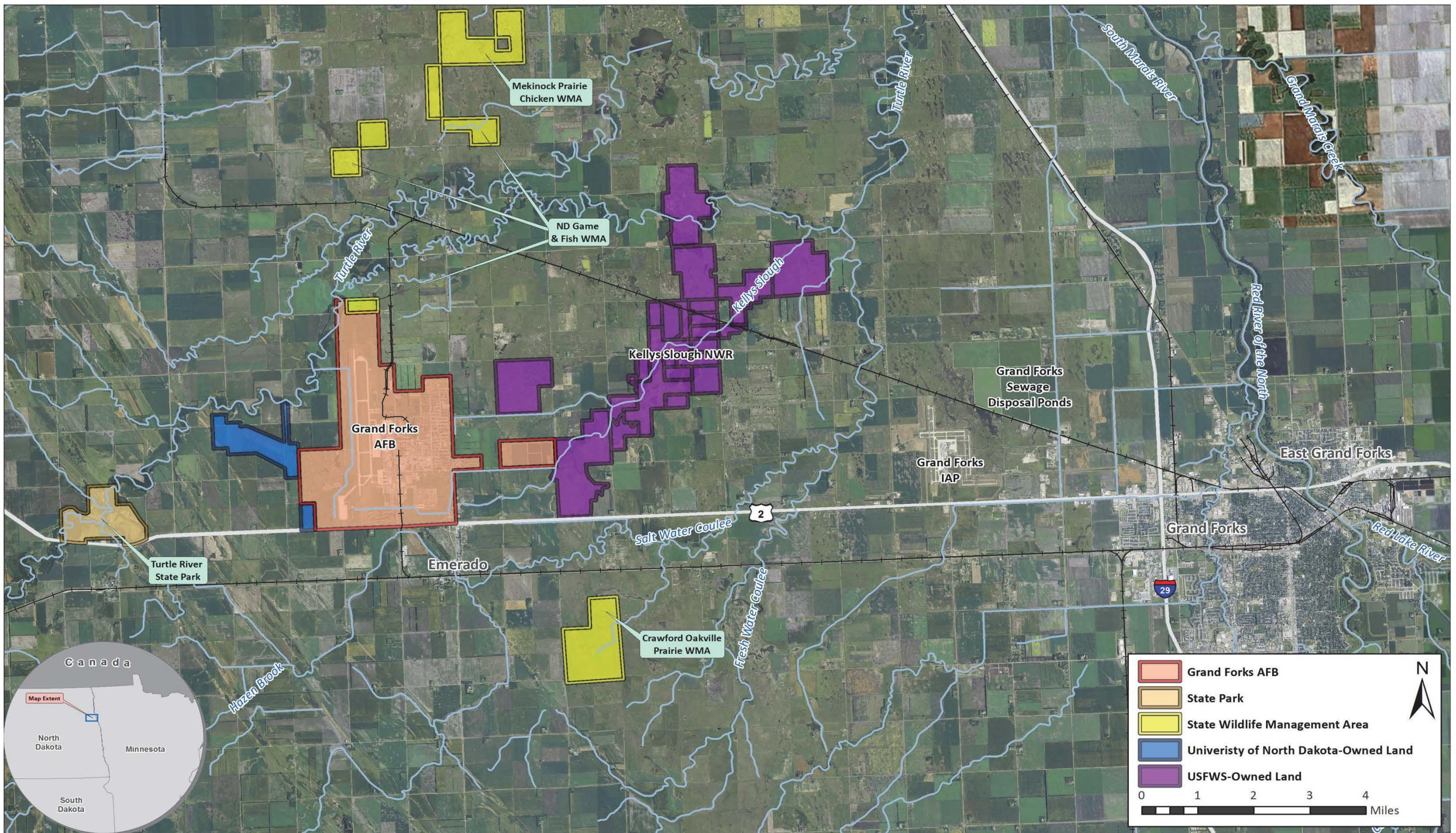


Figure 1-1. Grand Forks AFB and Surrounding Area

## 1.4 Summary of Key Environmental Compliance Requirements

### 1.4.1 National Environmental Policy Act

NEPA (42 U.S.C. Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental impacts associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decision makers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decision making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI) or FONSI/Finding of No Practicable Alternative (FONPA), where a FONPA is appropriate (see **Section 1.4.2**), or whether the preparation of an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the USAF will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is *Environmental Impact Analysis Process*, 32 CFR Part 989, as amended.

### 1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decision making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decision maker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated “with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively.”

## 1.5 Scope of the Analysis

This EA examines potential effects of the Proposed Action and alternatives on six resource areas: land use, air quality, geological resources, water resources, biological resources, and safety. These resources were identified as being potentially affected by the Proposed Action and include applicable elements of the human environment that are prompted for review by EO, regulation, or policy. While not comprehensive, a list of potentially applicable laws, regulations, policies, and planning criteria is provided in **Table 1-1**.

**Table 1-1. Listing of Applicable Statutes and Regulations**

<b>Regulation</b>	<b>Source</b>
<b>Air Quality</b>	
Clean Air Act of 1970 and Amendments of 1977 and 1990, including the General Conformity Rule and the Greenhouse Gas Tailoring Rule	42 U.S.C. 7401 et seq., as amended
Air Quality Compliance	Air Force Instruction (AFI) 32-7040
Federal Leadership in Environmental, Energy, and Economic Performance (5 October 2009)	EO 13514
<b>Water Resources</b>	
Clean Water Act of 1972	33 U.S.C. 1251 et seq., as amended
Safe Drinking Water Act of 1974	42 U.S.C. 300
Water Quality Compliance	AFI 32-7041
Protection of Wetlands (24 May 1977)	EO 11990
Floodplain Management (24 May 1977)	EO 11988
<b>Biological Resources</b>	
Endangered Species Act of 1973	16 U.S.C. 1531–1543
Migratory Bird Treaty Act of 1918	16 U.S.C. 703–712
Sikes Act Improvement Act of 1977	16 U.S.C. 670a–670o, 74 Stat. 1052
Bald and Golden Eagle Protection Act of 1940	16 U.S.C. 668–668c, as amended
Invasive Species (3 February 1999)	EO 13112
Protection and Enhancement of Environmental Quality (5 March 1970)	EO 11514
Federal Leadership in Environmental, Energy, and Economic Performance (5 October 2009)	EO 13514
Conservation of Migratory Birds (10 January 2001)	EO 13186
Integrated Natural Resources Management	AFI 32-7064
<b>Safety and Occupational Health</b>	
Air Force Occupational and Environmental Safety, Fire Protection, and Health Program	AFI 91-301
USAF Mishap Prevention Program	AFI 91-202
Protection of Children from Environmental Health and Safety Risks (23 April 1997)	EO 13045

### **1.5.1 Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), Native American Tribal Consultation, and Public Involvement**

**Interagency and Intergovernmental Coordination for Environmental Planning.** NEPA requirements help ensure that environmental information is made available to the public during the decision making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing

a Federal proposal. AFI 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*, requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, Grand Forks AFB notifies relevant Federal, state, and local agencies of the Proposed Action and alternatives and provides them sufficient time to make known their environmental concerns specific to the action. The IICEP process also provides Grand Forks AFB the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. IICEP materials related to this EA are included in **Appendix A**, and will be expanded throughout the EIAP process.

**Native American Tribal Consultation.** EO 13175, *Consultation and Coordination with Indian Tribal Governments* (6 November 2000), directs Federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. To comply with legal mandates, federally recognized tribes that are affiliated historically within the Grand Forks AFB geographic region are invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. Because many tribes were displaced from their original homelands during the historical period, tribes with cultural roots in an area might not currently reside in the region where the undertaking is to occur. Effective consultation requires identification of tribes based on ethnographic and historical data and not simply a tribe's current proximity to a project area. The tribal consultation process is distinct from NEPA coordination or the IICEP processes and requires separate notification of all relevant tribes by Grand Forks AFB. The timelines for tribal consultation are also distinct from those of intergovernmental consultations. The Grand Forks AFB Government representative point-of-contact for Native American tribes is the Installation Commander. The Grand Forks AFB point-of-contact for consultation with the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP) is the Cultural Resources Manager.

The goal of the tribal consultation process is not simply to consult on a particular undertaking but rather to build constructive relationships with the appropriate Native American tribes. Consultation should lead to constructive dialogs in which Native American tribes are active participants in the planning process. As such, consultation regarding specific proposed projects must begin very early in the process and remains outside the scope of the EA. Grand Forks AFB is in the process of developing government-to-government relationships with affiliated federally recognized tribes. A letter requesting consultation was sent to each affiliated tribe describing the Proposed Action on Grand Forks AFB to ask them to identify any concerns they might have. The list of all Native American tribal governments with whom consultation on the Proposed Action has occurred is included in **Appendix A**.

**Public Involvement.** Concurrent with the completion of the Draft EA, a Notice of Availability (NOA) was published in the *Grand Forks Herald* on January 5, 2013 and the Draft EA was made available to the public for a 30-day review period ending on February 5, 2013. The NOA was issued to solicit comments on the Proposed Action and involve the local community in the decision making process. No public comments were received during this period.

## 2. Description of the Proposed Action and Alternatives

This section presents information on the Proposed Action related to the management of nuisance species as identified in various current natural resources management plans, including the *Pesticide Management Plan for Grand Forks Air Force Base, North Dakota* (GFAFB 2007a), the *Final Integrated Natural Resources Management Plan* (GFAFB 2011), and *Mosquito Management Plan*. **Section 2.1** describes the Proposed Action in detail at Grand Forks AFB. **Section 2.2** identifies alternatives to the Proposed Action, including the No Action Alternative. **Section 2.3** identifies the decision to be made and the Preferred Alternative.

### 2.1 Detailed Description of the Proposed Action

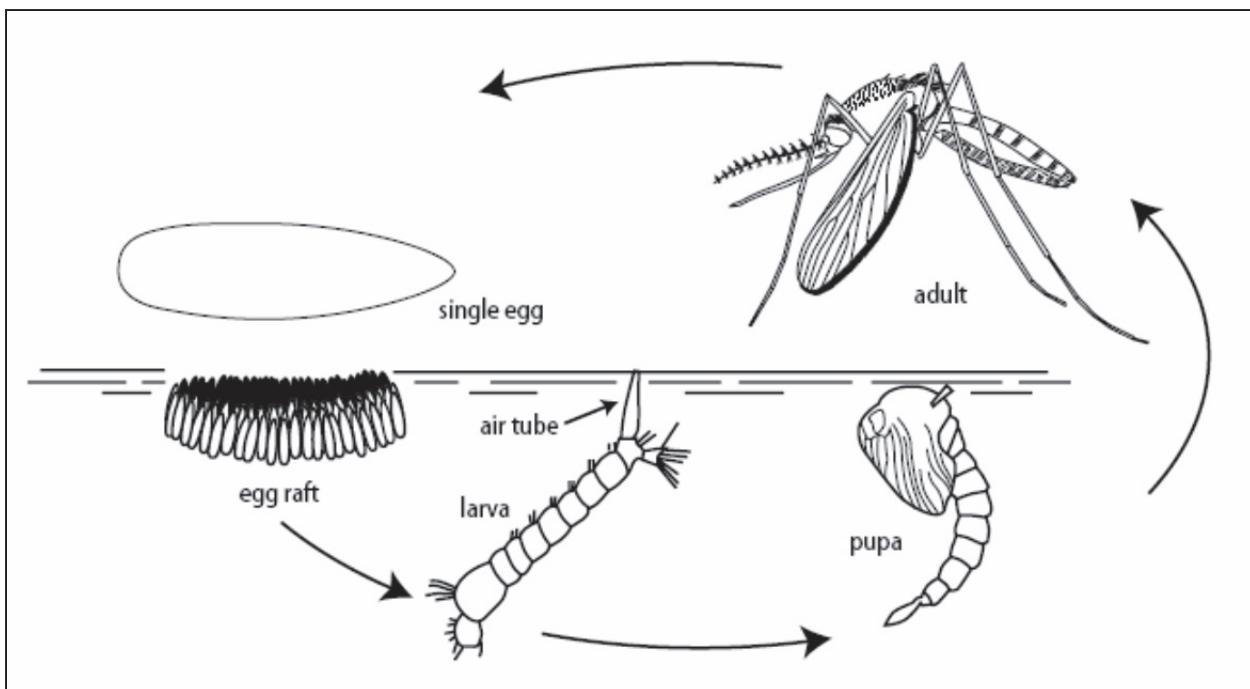
The purpose of the Proposed Action is to apply appropriate techniques to manage and control mosquitoes and noxious and invasive weed species to improve the quality of the human and natural environment at Grand Forks AFB and the surrounding area. Mosquito control is proposed to occur in an integrated manner, by setting traps, conducting aerial spraying (on and off installation) and ground spraying (on installation), reducing breeding and hatching sources (i.e., removal of standing water), and introducing predators or parasites. This EA would implement the MMP. Chemical noxious weed control is proposed to be expanded, and chemical, biological, and cultural controls are proposed. Application of herbicides would occur on the installation to control the spread of noxious weeds. The two operations associated with the Proposed Action are discussed in detail in the following paragraphs.

#### 2.1.1 Mosquito Control

##### Mosquito Biology

At least 43 species of mosquitoes are known to occur in North Dakota and share one common life history trait: the mosquito life cycle requires standing water. Mosquito species are broadly separated into two groups according to where they lay eggs: floodwater mosquitoes and standing water mosquitoes. Adult female floodwater mosquitoes lay eggs on mud or previously submerged vegetation. The eggs can remain dormant for days, months, or even years until the land is flooded, at which time larvae hatch. Standing water mosquitoes lay eggs on the water surface. The eggs float on the surface for a few hours to a few days until the larvae hatch into the water. Floodwater mosquito larval development (breeding) sites include irrigated pastures, seasonally flooded duck clubs and other managed wetlands, riparian corridors, and snowmelt pools. These intermittent or seasonally flooded habitats can be among the most productive sources of mosquitoes because they are often free of natural predators. Standing water mosquito breeding sites include artificial containers, treeholes, catch basins, open ditches, retention/detention ponds, natural or constructed ponds and wetlands, storm water management devices, and along the edges of flowing streams. Sources are found everywhere from highly urban areas to natural wetlands and often produce multiple generations of mosquitoes each season.

All mosquitoes live in water continuously from the time the eggs hatch through the larval (wiggler) and pupal stages. Mosquitoes can live as larvae from a couple of days to more than a month depending on the species, water temperature, and the amount of food available. Some mosquito larvae species overwinter by burrowing in mud. Mosquitoes then go through a nonfeeding stage called a pupa. During this stage the mosquito changes into the winged adult form. The easily identified comma-shaped pupae lie parallel to the water surface and move down through the water column in a rolling or tumbling motion when disturbed. This life stage can last from 1 to 4 days, depending on the species and water temperature, with the mosquito emerging from the back of the pupal case (above the water) as a flying adult (see **Figure 2-1**).



Source: CDPH 2010

**Figure 2-1. Mosquito Life Cycle Consisting of Four Stages: Egg, Larva, Pupa, and Adult**

As the adults emerge from the pupal cases, the wings expand and after a few hours the exoskeleton sufficiently hardens for flight. The female then seeks a blood meal from a human or animal to aid in egg development. To take a blood meal, the female's proboscis (mouthparts) pierces the skin, injects saliva, and sucks blood out. It is through the injection of saliva that a mosquito causes the typical itchy bump and can infect a person or domestic animal with a disease-causing organism. Depending on an individual's immune response, even a single bite can be a significant nuisance. Adult mosquitoes often rest in weeds, tall grass, or other vegetation but never reproduce there. After a few days, the females return to their preferred pools to deposit eggs and the cycle begins again. Multiple generations a year are possible.

Most mosquito species survive the winter, or overwinter, in the egg stage, awaiting the spring thaw, when waters warm and the eggs hatch. Only a few species can overwinter as larvae. A few species spend the winter as adult, mated females, resting in protected, cool locations, such as cellars, sewers, crawl spaces, and well pits. With warm spring days, these females seek a blood meal and begin the cycle again.

Mosquito-borne diseases, such as malaria and yellow fever, have plagued civilization for thousands of years. Organized mosquito control in the United States has greatly reduced the incidence of these diseases; however, there are still a few diseases that mosquitoes in North Dakota can transmit, including West Nile Virus, Western Equine Encephalitis, and St. Louis Encephalitis. The frequency and extent of these diseases depend on a complex series of factors.

Mosquito-control agencies and health departments are aware of these factors and work cooperatively to reduce the chance of disease. Adult female mosquitoes transmit diseases after picking up a disease organism during a blood meal.

## Mosquito Management Program

Grand Forks AFB proposes to implement an integrated pest management (IPM) program for mosquito control as outlined in the MMP. An IPM program for controlling undesirable species involves the use of types of control other than strictly chemical means. Recommended actions in the MMP that are analyzed in this EA are divided into the chemical control and physical/biological control categories:

### Chemical Control:

- Use Vectobac® granules (granular *Bacillus thuringiensis israelesis [Bti]*) for larvae in wetland areas.
- Use Altosid® briquettes at small breeding sites such as catch basins or puddles that continuously breed mosquitoes.
- Use Altosid® liquid larvicide for ground and aerial applications.
- Use Anvil®, Kontrol 4-4, or Duet™ for adulticiding using ground applicators.
- Use barrier sprays (such as Mavrik®) in suitable locations during periods of high mosquito infestations, in addition to the continued use of space sprays with ground ultra-low volume (ULV) equipment.
- Use a variety of pesticides to reduce the likelihood of pest resistance (see **Table 2-1**).
- Use aerial adulticiding to treat large areas quickly when mosquito populations are very high.

### Physical/Biological Control:

- Install additional bat boxes to introduce more mosquito predators to the area.
- Enhance freshwater areas to increase the population of invertebrates, fish, and amphibians to reduce larval and adult mosquito populations.

The proposed MMP incorporates the elements of effective mosquito-control activities that Grand Forks AFB has determined to be best suited for the conditions at the installation. The proposed plan consists of adopting the following key components:

**Larval Mosquito Surveillance and Chemical Control.** Currently, larval surveillance is conducted during times of peak activity (i.e., summer months) by the Public Health Flight and Pest Management Shop. Larval dipping is used to determine the presence of larvae at likely developmental sites at Grand Forks AFB. Likely developmental sites include wetlands and ditches on Grand Forks AFB (shown on **Figure 2-2**). Larval dipping is the preferred method of surveillance with presence of larvae indicating a need for control at that location. **Figure 2-2** also shows mosquito abundance based on sampling during summer 2011.

Pesticides that control mosquito larvae are called larvicides, which include treatment of the water to kill the mosquitoes prior to emergence as flying, biting adults. Larvicides would be applied by hand, from hand-held or vehicle-mounted engine-driven blowers, or by aircraft, depending on the product, the formulation, and the target habitat. Applicators of any of these products would be certified by the North Dakota State University Extension Pesticide Certification and Training Program, or the Department of Defense (DoD). The North Dakota Department of Health (NDDH) issued a public notice on 1 February 2011 with the intent to issue a North Dakota National Pollutant Discharge Elimination System Discharge Permit to authorize pesticide applications to surface waters.

As of 31 October 2011, effluent discharge general permits are required for discharges of pesticides (including herbicides) to state surface waters. To comply with the permit requirements, pesticide applications must be made in accordance with state pesticide regulations, FIFRA, and the instructions on the pesticide label. The permit includes a requirement to notify the NDDH prior to pesticide applications to waters of the state for control of aquatic pests as provided in state water quality regulations (NDDH 2011a, NDDH 2011b). Coverage under this permit would be required prior to initiating the Proposed Action.

Approved larvicides (i.e., insect growth regulators [IGRs], microbial larvicides, organophosphates [OPs], and surface oils and films) that might be used at Grand Forks AFB and are approved by DoD and the State of North Dakota appear in **Table 2-1**, and are discussed further in the following paragraphs.

*Insect Growth Regulators.* IGRs disrupt the physiological development of larvae, thus preventing adults from emerging. The two products currently available for controlling mosquito larvae are methoprene and diflubenzuron. The effective life of these products varies with the formulation. Methoprene can be applied in granular, liquid, pellet, or briquette formulation. Methoprene has minimal non-target effects and no use restrictions. Diflubenzuron is rarely used because it can affect growth of non-target aquatic invertebrates. IGRs for mosquito control can be used in sources of water that are consumed by humans.

*Microbial Larvicides.* Microbial larvicides are formulated to deliver a natural toxin, in the form of bacteria, to the intended target organisms. Bacteria are single-celled parasitic or saprophytic microorganisms that can exhibit both plant and animal properties and range from harmless to beneficiary to virulent and lethal. *Bacillus thuringiensis* (*Bt*) is the most widely used agricultural microbial pesticide in the world, and a majority of microbial pesticides registered with the U.S. Environmental Protection Agency (USEPA) are based on *Bt*. Mosquito control agents based on *Bt* are the second most widely registered group of microbial pesticides. Two products that are available against mosquito larvae singly or in combination are *Bt* and *Bacillus sphaericus*.

*Organophosphates.* The term OP refers to all pesticides containing phosphorus. OPs work after entry into and distribution through the body of the target organism by modifying the normal junctions of some nerve cells. In insects, OPs produce a loss of coordination leading to paralysis and, ultimately, death. A common OP is temephos (Trade name: Abate), which is currently the only OP registered for larvicide in North Dakota.

**Adult Mosquito Surveillance and Chemical Ground Control.** Surveillance and control of adult mosquitoes would be accomplished through a network of CDC traps and mosquito annoyance reports filed through the Pest Management Shop. Adult mosquito surveillance is a critical component to determine where mosquitoes are originating from, the potential for disease transmission in an area, and the need for adult mosquito control. Grand Forks AFB would also use adult surveillance as a feedback or quality control mechanism to determine how effective the overall program would be in reducing mosquito populations.

Trapping adult mosquitoes and submitting those mosquitoes for identification and to test for the presence of arbovirus activity would occur through the use of facilities at Brooks AFB or the City of Grand Forks Mosquito Control District (GFMCD). Collecting baseline data on mosquito populations and mosquito-borne disease would also help target educational efforts within the Grand Forks AFB and the surrounding community.

Grand Forks AFB would initiate adult mosquito control when action levels or thresholds were reached or exceeded. The threshold for adult mosquito control is based on the 100 count trap threshold established in the MMP. Threshold values are dependent on several factors including the following:

- Overall mosquito abundance
- Presence of mosquito-borne disease in the region
- Abundance of mosquito species that are vectors of disease
- Climate data
- Local acceptance of adult mosquito-control activities
- How local citizens tolerate nuisance mosquitoes by evaluating public service requests.

Only adult mosquitoes can be chemically controlled with adulticides. Adulticiding should be considered as the last resort and conducted only when larvicide and cultural-control methods are not practical. Adulticiding falls into two categories: barrier applications and ULV applications. Barrier applications target resting mosquitoes by applying pesticides to vegetation and structures. Barrier applications typically cover relatively small areas and are applied to alleviate specific problems rather than an areawide adult mosquito problem.

ULV applications are used to control adult mosquitoes over large areas. A ULV (typically less than 2 ounces per acre [140 milliliters per hectare] total volume) of tiny oil or water droplets carrying an insecticide would be emitted from specialized equipment mounted on trucks or aircraft. The droplets kill adult mosquitoes on contact. ULV applications would be made just before and after sunset or before sunrise to coincide with the time that mosquitoes are most active, when non-target insects are least active, and when temperature inversions (an increase in temperature with altitude) are most likely to occur. These applications would be employed when mosquito populations reach pre-established threshold numbers through surveillance (as described in the previous paragraphs) or must be reduced immediately to halt disease transmission. The Non-Commissioned Officer in Charge (NCOIC) would determine when to initiate mosquito controls and what methods of treatment should be employed. Pesticides approved for such use are identified in **Table 2-1**. Grand Forks AFB would operate appropriate spray equipment to perform both ULV and barrier spray programs on an as-needed basis. Current DoD Pesticide Applicator Certification or state pesticide applicator certification would be required for all personnel applying pesticides. Supplemental training discussed in the MMP is proposed to train personnel on mosquito-control measures specific to the Grand Forks area, including the effects of meteorology and timing on treatment efficacy.

Chemicals would be handled and stored according to label requirements. Chemicals currently registered for ULV applications against mosquitoes in North Dakota include OPs (e.g., naled), pyrethrins (e.g., pyrethrum), and pyrethroid (e.g., resmethrin, sumithrin, permethrin, and etofenprox). With the exception of the active ingredient etofenprox, formulations of both pyrethrins and pyrethroids include the synergist piperonyl butoxide (PBO), which increases their effectiveness against mosquitoes.

The NCOIC of Pest Management is responsible for determining when mosquito-control treatment would be employed.

*Organophosphates.* Naled is a neurotoxin that acts by inhibiting neurologic transmission. Naled is highly toxic to bees and is used to control spider mites, aphids, and other insects on many crops. Coordination with local beekeepers and farmers would occur prior to spraying (see **Figure 2-3** for beehive locations). Applying naled as close to sunset as possible should reduce mortality of foragers in cultivated hives and wild colonies.

*Pyrethrins and Pyrethroids.* Pyrethrins and pyrethroids are neurotoxins that act by causing uncontrolled firing of neurons. Pyrethrum is a natural insecticide derived from chrysanthemum flowers. Adult mosquitoes are rapidly paralyzed and killed on contact. Pyrethrins are degraded rapidly by sunlight and chemical processes. Residual pyrethrins from ULV applications typically remain less than 1 day on plants, soil, and water.



**Figure 2-2. Potential Mosquito Larval Breeding Wetlands and Mosquito Abundance Based on Summer 2011 Sampling**

**Table 2-1. Potential Pesticides for Nuisance Species Control at Grand Forks AFB**

<b>Herbicide/ Pesticide Name</b>	<b>Type</b>	<b>USEPA Number</b>	<b>Active Ingredient</b>	<b>Application Rate</b>	<b>Target Species</b>
Altosid® Liquid Larvicide <sup>1</sup>	IGR	2724-446	Methoprene (20%)	0.75 ounces per 5 gallons of water	Mosquito Larvae
Altosid® XR Briquettes <sup>2</sup>	IGR	2724-421	Methoprene (2.1%)	1 briquette per 100 square feet	Mosquito Larvae
Vectobac® Granules <sup>3</sup>	Microbial larvicide	73049-10	<i>Bacillus thuringiensis israelensis</i>	2.5 to 10 pounds per acre	Mosquito Larvae
Trumpet Liquid Adulticide <sup>4</sup>	OP	300-76-5	Naled	0.6 to 1.2 fluid ounces per acre	Adult Mosquitoes
Mavrik® <sup>5</sup>	Synthetic Pyrethroid	2724-478	Fluvalinate	0.75 ounces per acre	Adult Mosquitoes
Anvil® <sup>6</sup>	Synthetic Pyrethroid	8329-61	Sumithrin and Piperonyl Butoxide	0.0012 to 0.0036 pounds per acre	Adult Mosquitoes
Duet™ <sup>7</sup>	Synthetic Pyrethroid	8329-01	Prallethrin and Sumithrin	0.0012 to 0.0036 pounds per acre	Adult Mosquitoes
Kontrol 4-4 <sup>8</sup>	Synthetic Pyrethroid	73748-4	Permethrin and Piperonyl Butoxide	0.0018 to 0.007 pounds per acre	Adult Mosquitoes

Sources: See data sheets in **Appendix B**.

Notes:

- All pesticides to be used during the Proposed Action are approved by the Armed Forces Pest Management Board and are regulated and approved by the USEPA and U.S. Department of Agriculture (USDA).
- All pesticides are DoD approved except for Duet™, which is currently in the process of being approved.
- All pesticides would be applied by certified DoD and NDDH personnel in both aquatic and public health categories.
- Pesticides used could change over time; if a new pesticide is chosen for use, Grand Forks AFB staff would ensure that impacts would be commensurate with those analyzed in this EA. If impacts would be greater than those analyzed in this EA, additional NEPA analysis would be conducted.

Key:

1. Altosid® liquid larvicide is proposed for ground and aerial application to control larvae.
2. Altosid® XR Briquettes are proposed for ground application of small water bodies (such as puddles) to control larvae.
3. *Bti* granules are proposed for treatment of larvae in large wetland areas.
4. Continued use of Trumpet is proposed for aerial application to control adult mosquitoes.
5. Mavrik® is proposed for use as a ground-based barrier spray to control adult mosquitoes.
6. Anvil® is proposed for ground application to control adult mosquitoes.
7. Duet™ is proposed for ground application to control adult mosquitoes.
8. Kontrol 4-4 is proposed for ground application to control adult mosquitoes.

Pyrethroids are manufactured pyrethrins. They have very low toxicity to birds and mammals but are toxic to fish if misapplied. Synthetic pyrethroids are not necessarily labeled for all agricultural crops and are, therefore, limited in their widespread use in the areas surrounding Grand Forks AFB. The pyrethroids Anvil®, Duet™, and Kontrol 4-4 are recommended for ground applications to control adult mosquitoes.

Pesticides used could change over time; if a new pesticide is chosen for use, Grand Forks AFB staff would ensure that impacts would be commensurate with those analyzed in this EA and that the label instructions would be followed. If impacts would be greater than those analyzed in this EA, additional NEPA analysis would be conducted.

**Adult Mosquito Aerial Chemical Control.** In addition to ground application of pesticides, Grand Forks AFB has controlled mosquito larvae and adult populations by conducting aerial spraying of pesticides within and in close proximity (within a 5-mile radius) to Grand Forks AFB when necessary.

Historically, aerial spraying has been conducted using C-130 aircraft from the 757 Airlift Squadron (AS) of the 910 Airlift Wing (AW) out of Youngstown Air Reserve Station (YARS), Ohio. Grand Forks AFB plans to continue to reserve flight time with YARS. The NCOIC, in conjunction with the installation's Public Health Flight, would continue to determine when to use the 757 AS. The overall mission of the 757 AS is to ensure the organization and individual members can perform command authority-directed taskings in support of national objectives by providing mission-ready forces, airlift and aerial spray operations, and base operating support. The 757 AS is able to assist the mosquito-control effort as the unit uses Grand Forks AFB as a training area. Grand Forks AFB is required to pay for the chemicals used during the aerial spraying effort on the installation only. Based on results from the *Environmental Assessment for Aerial Application of Pesticide for Mosquito Control, Grand Forks Air Force Base, North Dakota and Vicinity* (2003), aerial spraying for mosquitoes was expanded to Grand Forks County and East Grand Forks, Minnesota. Kellys Slough National Wildlife Refuge (NWR) is excluded. The application of microbial and chemical insecticides by aerial dispersal has proven to be a fairly effective means to reduce mosquito populations of certain species.

In 2011, three aerial spray applications to treat mosquitoes were approved by the NDDH to be conducted: 23 to 27 May (larvicide application), 27 June through 1 July (adulticide application), and 8 through 12 August (adulticide application). Applications were permitted to occur within 2 hours of sunset, and covered Grand Forks AFB and the cities of Grand Forks, Larimore, and Emerado (NDDH 2010a). This is generally when mosquito activity (biting and feeding) is greatest and weather conditions (wind and humidity) are most favorable for applications (GFAFB 2003a). Aerial spraying is conducted at an elevation of 150 to 300 feet.

As with past aerial adulticide applications, the exact extent of each application would be determined in coordination with communities within Grand Forks County and the City of Grand Forks. Grand Forks AFB would continue to offer to treat these communities with the YARS service before Grand Forks AFB finalizes a pesticide application. **Figure 2-3** shows the communities willing to participate in the aerial spraying for mosquitoes. Townships adjacent to Grand Forks AFB that have not been treated in the past typically have not had the funds and are not very populous. Prior to aerial spraying, communities interested in participating in the aerial spray program must pay the cost of the pesticide, provide a notice of intent per the North Dakota Pesticide General Permit (PGP), obtain a NPDES permit if necessary, and sign a hold-harmless agreement with Grand Forks AFB. Additionally, in order for the YARS service to continue, communities interested in participating must file an Innovative Readiness Training Request for Military Assistance form (see **Appendix C**).

If aerial spraying is contracted, a statement of need would be prepared and applications would be conducted in accordance with AFI 32-1074, *Aerial Application of Pesticides*. An Aerial Spray Statement of Need was issued in October 2000 authorizing aerial application of pesticides for mosquito control. EAs were completed in 2001 and 2003, and a FONSI was signed (GFAFB 2001, GFAFB 2003a). The Aerial Spray Coordinator responsibilities are shared between the Bioenvironmental Engineering Flight and the Pest Management Shop, and must be coordinated with the NDDH. Many aspects must be addressed when identifying areas to be sprayed such as the location of beehives, organic farms, and other

potentially sensitive areas (see **Figure 2-3**). The Bioenvironmental Engineering Flight would be notified at the beginning of each fiscal year of any proposed application of larvicides or herbicides to ditches, wetlands, or lagoons (GFAFB 2010a).

It is estimated that aerial applications of Trumpet would occur four times a year, twice in the spring and twice in the fall, and would be required each year to adequately control mosquito larvae and adult populations. The frequency and elevation of flights would be similar to those used in the past; however, more spray events could occur if necessary. Total areas requiring treatment would be identified by the surveillance program. Potential habitats requiring treatment consist of ditches, wetlands, other waters of the United States, and flooded fields.

**Adult Mosquito Physical and Biological Controls.** Source reduction (eliminating the places where mosquito larvae hatch and develop) is the most effective method to prevent adult mosquitoes; however, it could be possible to eliminate mosquito production from a source through other modifications of habitat or water management. Biological control agents, including native or introduced predators, are often used in combination with water management practices.

Following the results of the larval breeding survey, Grand Forks AFB would review the status of all breeding sites and determine the potential for source reduction, water management opportunities, and biological control measures. Current observations suggest that adopting a routine storm water drainage management program throughout Grand Forks AFB would assist extensively in reducing mosquito populations. Biological control could also be encouraged by installing additional bat boxes and enhancing the existing habitat of predators and freshwater habitats in the area.

**Mosquito Education Program.** An Education Program lead by the Pest Management Office is critical to the success of any mosquito-control program by achieving the support of an informed public. Many of the successful strategies for control involve individuals, their families, and their neighborhoods. The public also has concerns about the problems related to mosquito populations and about pesticides and spraying. Development of a mosquito control program that includes public education about preventing the breeding of mosquitoes, personal protection guidance, and the activities and success of the Grand Forks AFB control program would be critical to its success.

## 2.1.2 Noxious and Invasive Weed Control

Controlling noxious weeds and other invasive vegetation species includes mechanical control, or the physical removal of the undesired plant; biological control, or the use of other species that consume and eventually kill the undesired plants; cultural control, or the use of various landscaping practices that cause poor growing conditions for the undesired species, and by conducting herbicide spraying using ground-control methods.

All installation areas are subject to DoD-approved herbicide applications. North Dakota has listed such weeds as musk thistle (*Carduus nutans*), leafy spurge (*Euphorbia esula*), absinth wormwood (*Artemisia absinthium*), field bindweed (*Convolvulus arvensis*), Canada thistle (*Cirsium arvense*), and spotted knapweed (*Centaurea maculosa*) as noxious. In addition, Grand Forks County has listed kochia (*Bassia scoparia*) as noxious. These are primarily found in semi-improved and unimproved vegetated areas of Grand Forks AFB. Some improved areas are continually mowed and sprayed extensively to maintain control over dandelions (*Taraxacum* sp.), thistle, and other broadleaf weeds. Areas in improved vegetated areas (1,309 acres) are frequently infested by dandelions, clover, and thistles. Improved pavement areas that include parking lots, roads, and sidewalks often have crack grass that requires control to maintain surface pavements. The semi-improved and unimproved areas (4,464 acres) of the installation host

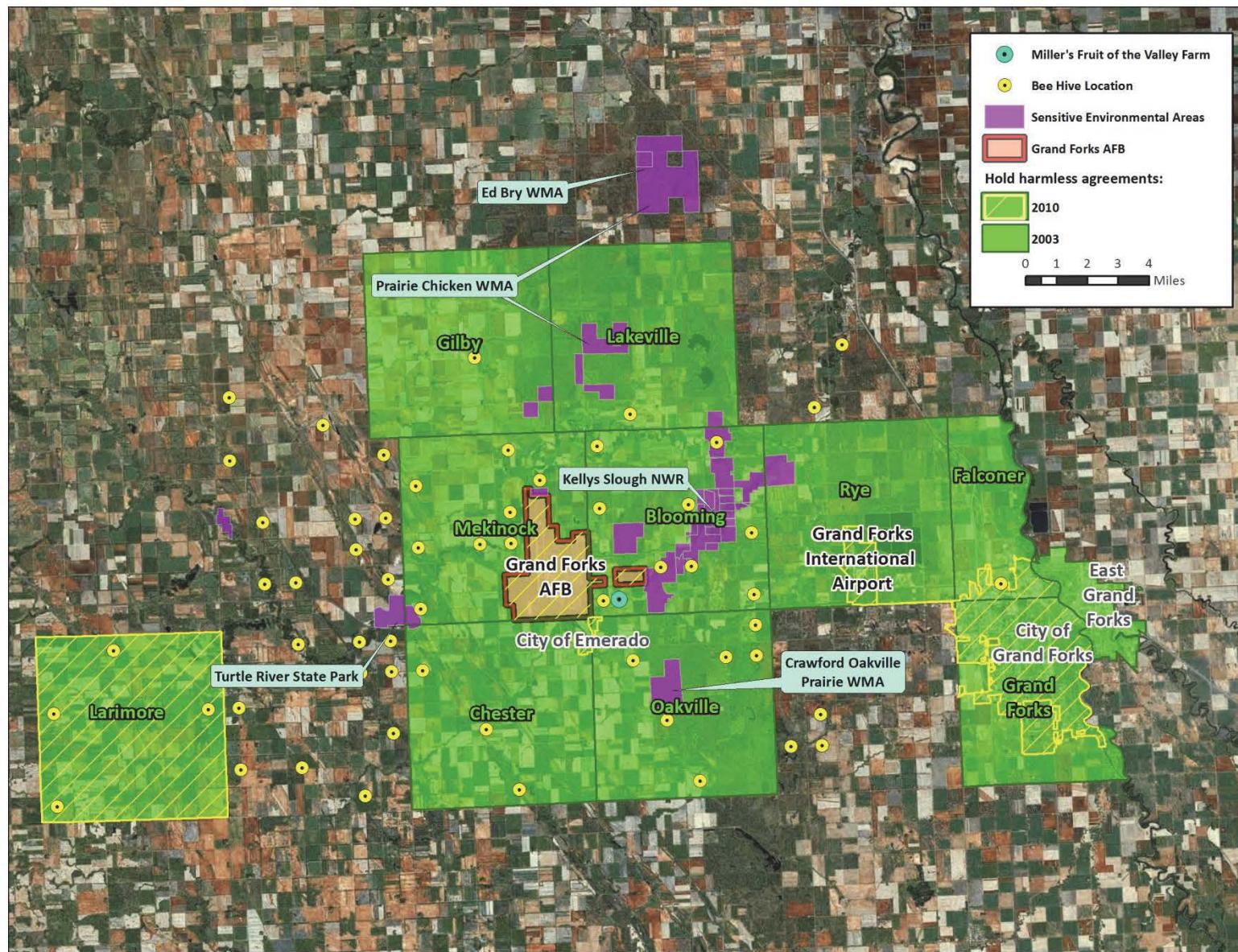


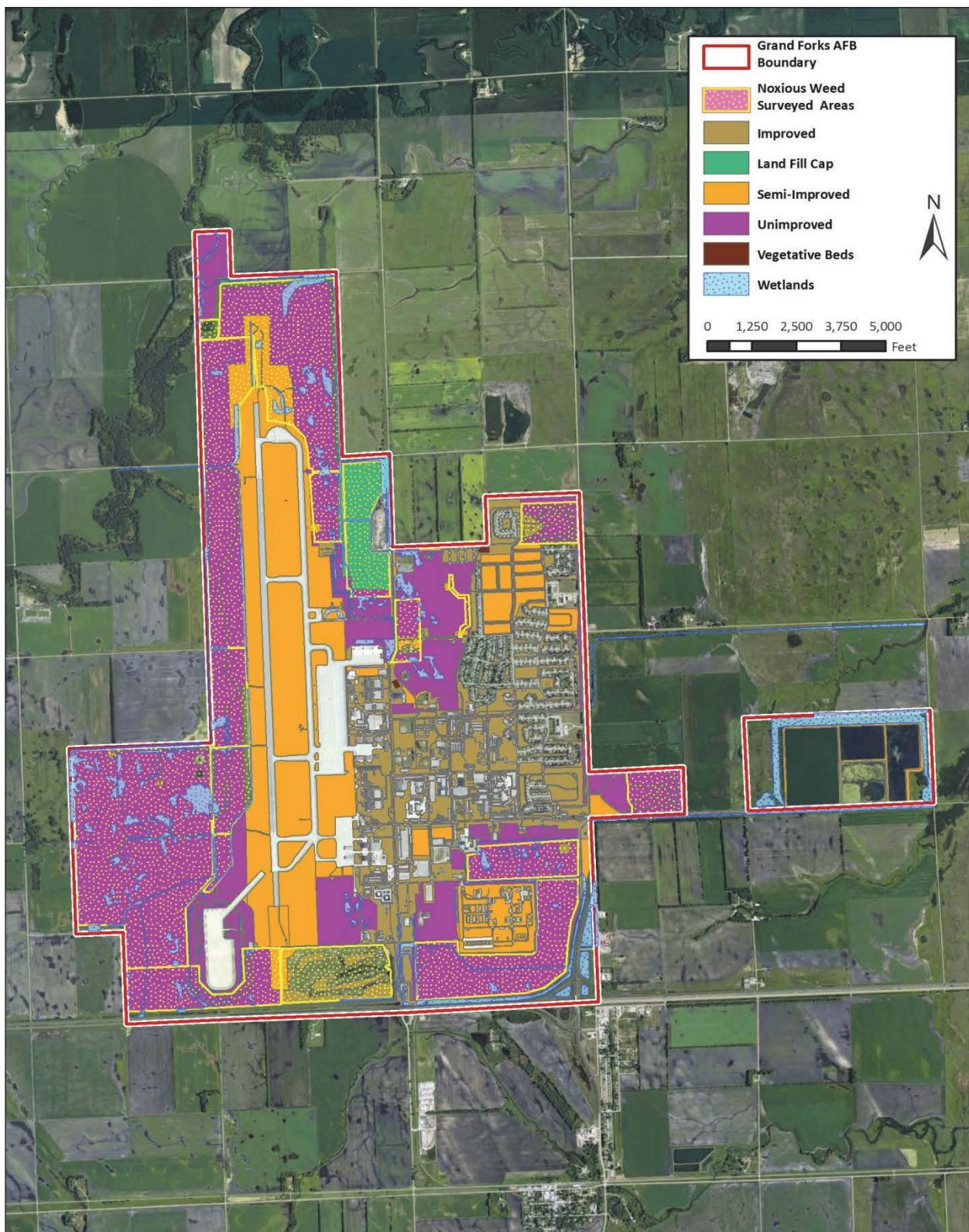
Figure 2-3. Potential Areas to be Treated for Mosquitoes

invasive and noxious weeds such as leafy spurge, Canada thistle, musk thistle, absinth wormwood, and spotted knapweed. Herbicides, mechanical methods, and biological controls are all techniques that could be employed on the prairies and grasslands of the semi-improved and unimproved areas. Some herbicide application or mechanical control would be required along the embankments of the wastewater lagoons east of the installation, and also to control infestations of weeds along ditches or within or adjacent to wetlands. Weed management on Grand Forks AFB focuses on the noxious weeds that invade open, undeveloped areas of the installation and other invasive or weedy species that are nuisances in the landscaping and green spaces of developed areas (see **Figure 2-4**). Overgrowth of vegetation in undesired areas such as fencelines, cracks and crevices of runways, sidewalks, and roads also pose a problem for installation personnel and require weed management. Occupants of military family housing can use self-help herbicides to control weeds. The products approved for self-help use include Roundup® and Weed-B-Gone.

EO 13112, *Invasive Species*, requires Federal facilities to prevent the introduction of invasive species on Federal lands, to control invasive populations, and to restore native vegetation in areas where infestation has occurred.

There are four state-ranked plants on the installation: the lesser yellow lady's slipper (*Cypripedium parviflorum* var. *parviflorum*), white lady's slipper (*Cypripedium candidum*), eastern prickly gooseberry (*Ribes cynosbati*), and Dutchman's breeches (*Dicentra cucullaria*). The lesser yellow lady's slipper and white lady's slipper are state-listed as imperiled or vulnerable, respectively, and are present along the flightline fence in the southwestern portion of the installation. The eastern prickly gooseberry (state vulnerable) and Dutchman's breeches (state critically impaired) exist in the northwestern part of the installation, where Turtle Creek is present. These areas should not be sprayed for weeds without coordination from the 319 CES/CEAN Environmental Management Element. In addition, a plant species of concern is the yellow lady slipper, which should be avoided during noxious weed spraying for bird/wildlife aircraft strike hazard (BASH) management and hay lease weed management operations (GFAFB 2010a).

The quality assurance evaluator for the grounds maintenance contract, along with the contractor, conducts weed surveillance of contract areas. The Pest Management Office, as needed, uses chemical applications in the improved areas of the installation, and, at times, to semi-improved areas. The Pest Management Shop controls weeds at the horse stables, recreational vehicle lot, transformer yard, and ditches. The natural resources manager has developed a noxious weed control plan, which surveys for weeds across the installation, monitors for weed trends, and implements a service contract to control noxious and invasive weeds mostly in unimproved and semi-improved areas. The unimproved and semi-improved areas generally are a mosaic of prairie grasslands and wetlands. The natural resources management contract currently uses mowing, prescribed burning, vegetation restoration, and herbicide applications in problematic areas to manage noxious and invasive weeds. Contractors must comply with AFI 32-1053, *Integrated Pest Management Program*, use approved DoD chemicals, follow all label and manufacturer's instructions, and have a North Dakota commercial herbicide applicator's license. All chemicals applied on Grand Forks AFB must be approved by 319 CES and reported and recorded by the Pest Management Shop to comply with the USAF Measures of Merit program.



Note: Weeds within housing areas are managed by residents.

**Figure 2-4. Grounds Maintenance Categories at Grand Forks AFB.**

## Grand Forks AFB Developed and Semi-Developed Areas

Developed and semi-developed areas on Grand Forks AFB that host invasive weedy species include green spaces, cracks and crevices in pavement, along fencelines, and within the sewage treatment lagoons to the east of the installation. Green spaces within Grand Forks AFB include the golf course and other parks and recreation areas, and lawns and landscaping around buildings. Maintenance of these areas would include the exclusion of nuisance species broadleaf weeds and invasive annual grasses. If such species are not managed and become established, they would quickly spread and cause conditions that not only are aesthetically displeasing, but also damaging to horticultural plantings through competition for available water, nutrients, and space.

The use of non-chemical means of controlling weeds in developed and semi-developed areas would be the preferred control technique. The most effective method of reducing weedy species in developed areas is the maximization of turf health in lawns and recreational areas. Properly timed watering cycles, mowing practices, fertilizer application, and thatch removal all work to maintain a healthy stand of grass that is not easily susceptible to the invasion of weeds.

Sparse individuals of undesirable weedy species can often be hand-pulled or otherwise mechanically removed. Proper selection of herbicides is important when chemical control is necessary, including the accurate identification of target weeds. The most common chemical used in lawn and landscaped areas includes some formulation of 2,4-Dichlorophenoxy-acetic acid (2,4-D).

Cracks and crevices often appear in developed areas such as runways, roads, parking areas, and sidewalks. Growth of vegetation in pavement cracks can cause major problems and should be controlled. Biological, mechanical, and cultural control in these areas is often unfeasible or impossible. Chemical products such as an isopropylamine salt of imazapyr, the active ingredient in Arsenal® Powerline, would provide control of existing weeds and is a ground sterilizer. Control resulting from the use of this product could last up to 1 year with a single application. Application of this chemical early in the growing season is best; while this product will eventually kill weeds once it is taken up into the root system, it does not kill weeds on contact. Therefore, if existing weeds are present, an additional application of a product such as isopropylamine salt of glyphosate, the active ingredient in Roundup®, would be made to free the area of weedy vegetation.

Vegetation must be maintained at the standard height of 2 to 4 inches under fencelines in improved grassy areas. Mechanical means of vegetation control, such as mowing, are employed as necessary. If herbicide use is warranted, it must be selective broad-leaf treatment to target weed species and not established grasses. If the fence is over concrete, herbicides are applied as necessary by the grounds maintenance contractor.

The sewage treatment lagoon diking system, approximately 2 miles to the east of the installation, requires weed control. The grass area around the sewage lagoons is required to be maintained to a maximum height of 7 inches, and grass clippings would not be blown into the lagoons. Rip-rap around the lagoons would be weed-free from the water level to the grass area, which can be accomplished by mechanical or chemical means (GFAFB 2007a).

Although trees and shrubs compose less than 5 percent of the land cover at Grand Forks AFB, woody invasives, such as the Russian olive (*Elaeagnus angustifolia*) and Siberian elm (*Ulmus pumila*), do persist. The woody invasives are present in the northwestern corner of the installation associated with Turtle Creek, and in shelterbelts in the housing area (GFAFB 2010a). Control of woody invasives would consist of mechanical means and herbicides. A frill-cut treatment could be used, where angled cuts are created at the lower trunk area of a tree and then filled with herbicide.

Herbicide application is dependent on the target weed species life cycle and the chemical chosen to control the weed. Application timeframes vary from early spring to late fall in North Dakota, and would be applied in accordance with manufacturer's recommendations.

### **Grand Forks AFB Undeveloped Areas**

Undeveloped portions of the installation support several noxious and invasive weed species. Surveys conducted in 2004 and 2008 found six state-listed noxious weed species (i.e., musk thistle, Canada thistle, leafy spurge, absinth wormwood, field bindweed, spotted knapweed), and one county-listed noxious weed species (i.e., kochia), along with several invasive species. Canada thistle and leafy spurge were found to be the most abundant noxious weed species on Grand Forks AFB. Canada thistle is a very aggressive perennial weed that reproduces both from seed and vegetatively from root sections and creeping rhizomes. This plant stores much of its energy in its root system, which allows it to recover from most attempts at control. The most successful control strategies include combining repeated physical methods (e.g., mowing) and application of chemical herbicides to stress the plant. A very effective chemical control for Canada thistle is the aminopyralid found in the herbicide Milestone®. Leafy spurge is a similarly aggressive, persistent perennial weed that reproduces from rootstock and from seeds that are often widely dispersed by animals. Effective control strategies for this plant include the use of leafy spurge flea beetles (*Aphthona flava* and *A. nigriscutis*) for large dense stands and the chemical Imazapic, the active ingredient in the herbicide Plateau®. Grazing herds of goats have also been found to be an effective biological control strategy as they actively seek out and graze on leafy spurge plants. **Table 2-2** shows potential herbicides that could be used as part of the Proposed Action.

Although most of the trees and shrubs in the Turtle River stand are native, there are a few Russian olive trees and buckthorn (*Rhamnus cathartica*) growing in the woodland. These species compete with native trees and shrubs for water, nutrients, and sunlight. Unmanaged nonnative grasslands are usually invaded by nonnative trees and shrubs such as Russian olive and Siberian elm, and by natives such as green ash (*Fraxinus pennsylvanica*), cottonwood (*Populus deltoids*), and sumacs (*Rhus spp.*). Any Russian olive trees and buckthorn shrubs should be removed, either mechanically or with herbicides to prevent further encroachment into the woodland (GFAFB 2010a).

As recommended in the *Noxious Weed and Invasive Plant Control Plan for Grand Forks AFB* (GFAFB 2003b), a season-based schedule of herbicide application (weed- and area-specific), mowing, and other management techniques such as prescribed burning would assist in reducing populations of noxious weed species. Repeated mowing during the year would help limit seed production. All of the grassland areas of the installation should be managed with attempts to mimic natural grazing and wild fire. Prescribed burning of grasslands mimic the historic prairie fires, which removes dead vegetation that hinders plant growth, releases nutrients to enrich the soil, reduces invader plants, and encourages growth of native species. Prairie plants are also adapted to grazing that helps maintain a diverse prairie habitat by altering the vegetation height and density. Mowing and haying simulate some features of grazing and are helpful and efficient in treating large areas of woody vegetation and alien weed overgrowth. Studies suggest a fire frequency of 3 to 5 years is best, with a mix of burns during spring and late summer for maintenance of a healthy and diverse prairie community. All prescribed conservation burning projects are described and programmed under the INRMP. In general, spring burning during late April is the preferred timing for controlled burn events with burns proposed every 3 to 5 years (GFAFB 2010a).

In addition to prescribed burning and mowing, restoration, revegetation, and interseeding of native species are employed to control these weed species. Restoration and use of native plants combat the spread of noxious and invasive weeds. Exotics, such as smooth brome, planted throughout the installation, are less adept at competing for resources against weed invaders like Canada thistle and leafy spurge. However, natural native grass stands are better competitors against weed invaders and, as such, are recommended for planting and restoration, where appropriate.

**Table 2-2. Potential Herbicides for Nuisance Species Control at Grand Forks AFB**

<b>Herbicide Name</b>	<b>USEPA Number</b>	<b>Active Ingredient</b>	<b>Application Rate</b>	<b>Target Species</b>
Rodeo®	524-343	Glyphosate (53.8%)	1 quart per 25 gallons of water	Grasses/Aquatic Weeds
Aquamaster®	524-343	Glyphosate	0.7 to 3.5 quarts per acre	Grasses/Aquatic Weeds
Arsenal® Powerline	241-431	Imazapyr	1.5 to 6 pints per acre	Grasses and Weeds
Milestone®	62719-519	Aminopyralid	3 to 7 fluid ounces per acre	Canada Thistle
Roundup®	524-475	Glyphosate	1 to 5 quarts per acre	Grasses/Weeds
Plateau®	241-365	Imazapic	4 to 12 ounces per acre	Leafy Spurge
Reward®	100-1091	Diquat (37.3 %)	1 gallon per 150 gallons of water	Grasses/Aquatic Weeds
Weed-B-Gone	228-424-239	2 Methyl-4-Chlorophenoxyacetic Acid 3,5,6-Trichloro-2-Pyridinyl oxyacetic Acid 3,6-Dichloro-o-Anisic Acid	Self-help product; 8 ounces concentrate per 2,000 square feet	Grasses/Weeds
Widematch®	62719-512	3,6-dichloro-2-pyridinecarboxylic acid, monoethanolamine salt, fluroxypyr 1-methylheptyl ester	10 gallons per acre	Broadleaf weeds

Sources: See data sheets in **Appendix B**.

Notes:

- The list of herbicides is anticipated to be refined during project development.
- All herbicides to be used during the Proposed Action are approved by the Armed Forces Pest Management Board and regulated and approved by the USEPA and USDA.
- All herbicides would be applied by certified DoD and NDDH personnel in both aquatic and public health categories.

Aerial spraying of herbicides was used once on the installation in 2005 because of the cost and large-scale project desired by the Community Planning Airfield Obstructions Program. There are multiple valuable crops surrounding the installation, and farmers in this area sometimes employ aerial spraying in years when the ground is too wet for ground spraying. Because drift damage was evident after the installation's effort in 2005, aerial spraying is not recommended in an effort to reduce drift risk and subsequently ensure the least amount of environmental damage.

### **Grand Forks AFB Wetland Areas**

Noxious weeds such as Canada thistle, phragmites, perennial sow thistle, and wavyleaf thistle invade the edges of wetlands on Grand Forks AFB. Although not a noxious weed, canary reed grass is very similar to phragmites in that it can influence the development of monocultures by outcompeting other forbs and native grasses in wetland areas, thereby reducing biodiversity. Removal of these weeds is required by law

and to promote the health and maintenance of the natural functions of wetlands. Weed removal could often be directly adjacent to wetland edges in the prairie areas, or could be buffered as appropriate depending on herbicide label recommendations related to application near water bodies. An integrated approach to weed removal from these areas could be implemented by incorporating mowing and interseeding wetland vegetation; or restoration by vegetation removal and reseeding, burning, or herbicide application.

The herbicides Rodeo®/Diquat are NDDH-approved herbicides for use in aquatic areas to control weeds and promote wetland restoration efforts (GFAFB 2003c). Use of herbicides within wetlands, ditches, or lagoons would be coordinated with the 319 CES/CEAN Environmental Management Element.

Rodeo® is an herbicide approved for use in aquatic systems, with glyphosate as the active ingredient. Rodeo® is most effective on emergent plants and kills the plant roots for weed control for multiple years. Glyphosate-based herbicides degrade rapidly in the environment and are practically nontoxic to aquatic animals. Glyphosate binds tightly to soil particles and does not bioaccumulate (CDFA 2003).

Diquat is an herbicide that has been used extensively in the United States since the late 1950s to control both crop and aquatic weeds. Diquat is available in numerous formulations. One that is commonly used is Reward®. Diquat is removed rapidly from aquatic systems, principally by adsorption. If initially adsorbed onto weeds, biodegradation to soluble or volatile products occurs in several weeks. When adsorbed to sediment, it is likely that little or no degradation occurs. Diquat is no longer detectable within the water column within 2 to 4 weeks after treatment. In surficial water layers, Diquat photodegrades in 1 to 3 or more weeks when not adsorbed to particulate matter (USEPA undated).

## 2.2 Alternatives to the Proposed Action

As part of the NEPA process, reasonable alternatives to the Proposed Action must be considered. The development of reasonable alternatives involved discussions with Grand Forks AFB installation personnel to identify the purpose of and need for the Proposed Action, potential alternative courses of action, designs, locations, and management practices for achieving the purpose and need. Consistent with the intent of NEPA, this screening process focused on identifying a range of reasonable operations-specific alternatives and, from that, developing a proposed action that could be implemented in the foreseeable future. The best solutions for controlling nuisance species at Grand Forks AFB are identified based on the following selection criteria:

- Fulfillment of current mission requirements
- Facility sustainability as mission evolves or changes
- Economic feasibility
- Consistency with state, regional, and local plans
- Consistency with DoD and USAF policies, guidance, and directives, including the INRMP and IPMP
- Effectiveness in protecting human health and alleviating effects on the environment
- Compatibility with local and installation flight activities, other ongoing activities, and regional pest control efforts
- Does not significantly increase the use of pesticides
- Environmental constraints (see Section 3).

### 2.2.1 Alternative 1 – Use of Chemical Controls

An alternative to the integrated program associated with the Proposed Action would be only to use chemical controls for treatment of mosquitoes and noxious weeds. Although chemical controls are an

integral part of IPM, nonchemical controls are promoted. Nonchemical controls are nontoxic, thereby reducing the potential risk of adverse effects on human health and the environment. Mosquito control would not be complete without the use of physical controls that would deplete the source of breeding sites, i.e., standing water. Without effective removal of breeding sites, mosquitoes could be introduced onto Grand Forks AFB from outside areas and repopulate the installation after pesticides have dissipated. Physical or cultural control measures are emphasized as the preferred methods and are applied first and then evaluated for effectiveness before the application of herbicides occurs. Chemicals are only used if necessary and are always minimally applied, as required, to control weeds.

The sole use of chemical controls would not adequately address pest management issues and this alternative does not meet the selection criteria presented in **Section 2.2**, including consistency with the INRMP and IPMP, and not significantly increasing the use of pesticides. Therefore, this alternative has been eliminated from further detailed analysis in the EA.

## **2.2.2 Alternative 2 – Use of Biological and Physical Controls**

An alternative to the integrated program associated with the Proposed Action would be only to use biological and physical controls for treatment of mosquitoes and noxious weeds, and to eliminate the use of chemical controls. However, this approach of using biological and physical means alone is not feasible, and would not be consistent with the installation's pest management plan or INRMP. Control of nuisance species is most effective when biological, physical, and chemical controls are implemented together. In addition, physical means of broadleaf weed control on mowed areas are not feasible. For the Proposed Action, nonchemical control (manually pulling weeds) was deemed infeasible because the area needing weed control covers a large part of the installation and substantial labor hours would be required. For mosquito control, source reduction is the most effective method to prevent adult mosquitoes; however, the use of chemical controls in conjunction with biological and physical controls provides a more holistic method to control mosquito populations effectively. Because the removal of chemical controls as a nuisance species management technique would not adequately address mosquito and noxious and invasive weed management issues and would not meet the selection criteria presented in **Section 2.2**, including facility sustainability as the mission changes or evolves, economic feasibility, consistency with policies and procedures in the IPMP, and effectiveness in protecting human health and alleviating effects on the environment, this alternative has been eliminated from further detailed analysis in the EA.

## **2.2.3 No Action Alternative**

CEQ regulations require consideration of the No Action Alternative for all proposed actions. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential alternatives can be compared and consequently it is carried forward for further evaluation in the EA. The No Action Alternative would be no change from current conditions. For mosquito management, current activities include: aerial treatment, ground spraying, and larviciding; and use of CDC light traps and larval dipping. The natural resources management contract currently uses mowing, prescribed burning, vegetation restoration, and herbicide applications in problematic areas to manage noxious and invasive weeds. Current methods of controlling mosquitoes and noxious weeds would continue under the No Action Alternative.

# **2.3 Decision to be Made and Identification of the Preferred Alternative**

The decision to be made by this EA is whether or not further environmental analysis must be accomplished in the form of an EIS. Implementation of the Proposed Action is the Preferred Alternative in this EA. The final decision on significance of the Preferred Alternative's impacts will be based on the

discussions in **Sections 3 and 4**. In the EA, Grand Forks AFB provides an evaluation of whether the Proposed Action would result in any significant impacts. Where such impacts are predicted, Grand Forks AFB would provide mitigation to reduce impacts to below the level of significance, undertake the preparation of an EIS addressing the Proposed Action, or abandon the Proposed Action. The EA will also be used to guide Grand Forks AFB in implementing the Proposed Action in a manner consistent with USAF standards for environmental stewardship.

### 3. Affected Environment and Environmental Consequences

All potentially relevant resource areas were initially considered for analysis in this EA. In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, the following discussion of the affected environment and environmental consequences focuses only on those resource areas considered potentially subject to impacts and with potentially significant environmental issues. All potentially relevant resource areas were initially considered in this EA. This section includes land use, air quality, geologic resources, water resources, biological resources, and safety. Some resource areas were eliminated from detailed analysis because of their inapplicability to the Proposed Action. The following provides the basis for such exclusions.

*Noise.* The Proposed Action would not include any significant changes in noise-related activities that could impact the ambient noise environment. Consequently, noise is not analyzed further in this EA.

*Infrastructure.* The Proposed Action would not be located in any utility corridors, include ground-disturbing activities within utility corridors, or significantly change utility systems loadings. Therefore, the Proposed Action would not be expected to impact utilities or similar infrastructure. Consequently, infrastructure is not analyzed further in this EA.

*Hazardous Materials and Wastes.* The Proposed Action would not involve any significant changes in the volumes or types of pesticides, or the process in which pesticides are managed, at Grand Forks AFB. No Installation Restoration Program sites would be impacted. Consequently, hazardous materials and wastes are not analyzed further in this EA.

*Socioeconomic Resources and Environmental Justice.* The Proposed Action would not involve any activities that would contribute to changes in socioeconomic resources. There would be no significant change in the number of personnel assigned to Grand Forks AFB; therefore, there would be no significant changes in area population or associated changes in demand for housing and services. The proposed activities are relatively small and would not affect local employment rates. North Dakota was the number one producer of honey in the United States in 2012 (USDA 2012). The spraying of pesticides could kill bees directly exposed to the application area. A decrease in the number of bees in the area would decrease the production of honey. However, because applications of pesticides would occur at dusk when bees are in the hive, and the installation has a system in place to notify beeyards of spraying operations, impacts on the honey production industry would be negligible. Consequently, socioeconomic resources and environmental justice is not analyzed further in this EA.

*Cultural Resources.* The Proposed Action would not involve any activities that would contribute to changes in or damages to cultural resources. The proposed activities are relatively small, and would not be sufficient to damage either archeological or architectural cultural resources identified either on the installation or off-installation properties. SHPO concurrence with this “Finding of No Historic Properties Affected” was received on 24 June, 2011. During early consultation efforts, in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, the installation received a comment from a Native American tribe regarding the extent of cultural resources surveys within the action area. The tribe requested monitoring actions for any ground disturbing activities occurring in areas that had not been surveyed. In accordance with the GFAFB Integrated Cultural Resources Management Plan, the installation would conduct cultural resources monitoring in the riparian or CE park area by a qualified archaeologist. Monitoring would be conducted in accordance with the SHSND during any required clearing and earth-disturbing activities scheduled for nuisance species control work in this area. No other tribe provided comments on this action (see **Appendix A**). Consequently, cultural resources are not analyzed further in this EA.

This section presents an analysis of the potential direct and indirect impacts that each alternative considered for detailed analysis (i.e., the Proposed Action and No Action Alternative) would have on the affected environment. Each alternative was evaluated for its potential to affect physical or biological resources in accordance with CEQ guidelines at 40 CFR 1508.8.

The following discussion elaborates on the nature of the characteristics that might relate to various impacts:

- ***Short-term or long-term.*** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.
- ***Direct or indirect.*** A direct impact is caused by and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- ***Negligible, minor, moderate, or major.*** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate impact is readily apparent. A major impact is one that is severely adverse or exceptionally beneficial.
- ***Adverse or beneficial.*** An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.
- ***Context.*** The context of an impact can be localized or more widespread (e.g., regional).
- ***Intensity.*** The intensity of an impact is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Impacts are also considered in terms of their potential for violation of Federal, state, or local environmental laws; their controversial nature; the degree of uncertainty or unknown impacts, or unique or unknown risks; if there are precedent-setting impacts; and their cumulative effects (see **Section 4**).

The impact analyses consider all alternatives discussed in **Section 2** that have been identified as reasonable for meeting the purpose of and need for action. These alternatives include the following:

- The Proposed Action (described in **Section 2.1**)
- Alternative 1 (described in **Section 2.2**)
- Alternative 2 (described in **Section 2.3**)
- The No Action Alternative (described in **Section 2.4**).

Best management practices (BMPs) would be implemented to reduce impacts on the environment. Even in the absence of BMPs, no significant impacts would occur and BMPs would not be required to reduce impacts to a level of insignificance. **Sections 3.1** through **3.6** discuss potential environmental impacts on the affected environment.

## 3.1 Land Use

### 3.1.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, “labels,” and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational. USAF installation land use planning commonly use 12 general land use classifications: Airfield, Aircraft Operations and Maintenance, Industrial, Administrative, Community (Commercial), Community (Service), Medical, Housing (Accompanied), Housing (Unaccompanied), Outdoor Recreation, Open Space, and Water (USAF 1998).

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. According to Air Force Pamphlet 32-1010, *Land Use Planning*, land use planning is the arrangement of compatible activities in the most functionally effective and efficient manner (USAF 1998). The highest and best uses of real property are obtained when compatibility among land uses fosters societal interest. Tools supporting land use planning within the civilian sector include written master plans/management plans, policies, and zoning regulations. The USAF comprehensive planning process also uses functional analysis, which determines the degree of connectivity among installation land uses and between installation and off-installation land uses to determine future installation development and facilities planning.

In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its “permanence.”

### 3.1.2 Existing Conditions

#### Grand Forks AFB

Grand Forks AFB consists of 5,773 acres and has an average daily population of 4,919 people with active-duty personnel consisting of approximately 1,693 military and 376 civilian employees (Vanderhoff 2010). The 319 ABW, who, in addition to providing logistical, medical, civil engineer, contracting, communications, security and force support, is also the host wing of the installation providing support to other tenants, including the 373rd Training Squadron Detachment, the Air Force Audit Agency, the USACE and the DHS.

The Grand Forks AFB general plan identifies 10 land use categories: Administrative, Aircraft Operations and Maintenance (O&M), Airfield, Community, Housing Accompanied, Housing Unaccompanied, Industrial, Medical, Open Space, and Outdoor Recreation (USAF 2008d). **Figure 2-3** shows the grounds maintenance categories that have been defined at Grand Forks AFB. The dominant land use at Grand Forks AFB is the Airfield, which runs north-south and occupies the central portion of the installation. Due to their interdependent natures, Aircraft O&M and Industrial uses are found in close proximity to the

Airfield. The main cantonment area is east of the airfield and includes all Administration, Housing (Accompanied and Unaccompanied), Medical, and Community uses; and most Outdoor Recreation uses. The primary land use west of the airfield is Open Space.

The proposed land use plan, as presented in the general plan, is similar to the existing land use categories; however, the proposed land use plan includes the following differences:

- Administrative uses would be consolidated in two areas along Steen Boulevard. The largest area, just west of the main entrance, would include most of the support administrative functions, while the other area would consist of the command and control functions.
- Aircraft O&M uses would be expanded to consist of one continuous band west of Eielson Street and east of the parking aprons (USAF 2006).

In addition to the 10 designated land uses, deer bow hunting and agricultural uses (e.g., cultivation of hay) are permitted in specific areas of Grand Forks AFB (GFAFB 2009a, GFAFB 2011). Bow hunting is permitted on the installation within the following areas: the unimproved area outside of the perimeter fence at the northwestern corner of the installation (commonly referred to as CE Park), a large area to the southwest of the airfield inside the installation perimeter fence, in the Munitions Supply Area (MSA) fields, within the Sunflake neighborhood, surrounding the sewage treatment lagoons, to the west of the Holly neighborhood, and within the Prairie View shelterbelt to the north of the Prairie View Court neighborhood and Prairie View Nature Preserve. Additional areas are open for bow hunting including the golf course to the south of the runways, the North Horse Pasture and Trail area, and the South Trail in the Holly neighborhood, depending on weather conditions. Hunting is not permitted within 200 feet of any building or dwelling within the authorized hunting area and in areas where training or other activities are occurring (GFAFB 2009a). CE Park is designated as Outdoor Recreation, and the area southwest of the airfield is designated as Open Space. Hay cultivation is permitted on Grand Forks AFB through the agricultural outlease program (see **Figure 3-1**). There is one hay lease consisting of 664 acres covering several sites inside the airfield fence (west, north, and east of the runway) and outside of the airfield fence (southwest, south, and southeast of the runway) (USAF 2007). The hay lease areas inside the airfield fence are designated as Airfield land use, whereas the areas outside of the fence are Industrial, Airfield, and Open Space. An additional hay lease is in progress and is scheduled to commence in spring 2010.

## Off-Installation Properties

Grand Forks AFB is in Mekinock and Blooming Townships in east-central Grand Forks County, North Dakota, near the North Dakota-Minnesota state boundary. It is north of and adjacent to the City of Emerado and approximately 15 miles west of the City of Grand Forks (see **Figure 1-1**). Access to Grand Forks AFB is provided by U.S. Highway 2 and North Dakota County Road B-3, which form the installation's southern and eastern boundaries, respectively. The area surrounding the installation is rural, consisting primarily of agriculture and open space (pasture, recreation, and wildlife habitat) with scattered residences. The major crops include potatoes, sugar beets, soybeans, corn, barley, spring wheat, sunflowers, and oats (GFAFB 2011). In addition to the urban uses in the City of Emerado, other uses surrounding Grand Forks AFB include a University of North Dakota-owned biological research area adjacent to the installation's western boundary, and the installation sewage treatment system on a separate parcel of land east of the main installation.

Grand Forks AFB is surrounded by Mekinock Township to the west and north, Blooming Township to the east, Oakville Township to the south-southeast, and Chester Township to the south. Grand Forks County has jurisdiction over land use and zoning within Blooming and Chester Townships. The land use designations within Blooming and Chester Townships primarily include Agricultural or Vacant; however,

there are several parcels designated Institutional or Public Land (installation family housing area and wastewater treatment plant, and Kellys Slough National Wildlife Refuge and Waterfowl Production Areas) east of the installation, and scattered Residential parcels. The primary future land use identified east and south of the installation is Agricultural and a small area in Chester Township south of Grand Forks AFB runway is designated as an Airport Protection Zone (Grand Forks County 2006a). The corresponding Grand Forks County zoning designations for these areas east and south of the installation include Airfield Reserve District, and Airfield Preservation District, and Floodplain Overlay District (Grand Forks County 2009, Grand Forks County 2006b).

Mekinock and Oakville Townships and the City of Emerado enforce land use and zoning regulations within their boundaries and extraterritorial areas (Grand Forks County 2006a). However, no land use or zoning information was available for the Oakville Townships and City of Emerado.

Off-installation properties considered in this EA include Mekinock Prairie Chicken Wildlife Management Area (WMA), North Dakota Game and Fish WMA, Crawford Oakville Prairie WMA, and Turtle River State Park.

***Mekinock Prairie Chicken WMA.*** Mekinock Prairie Chicken WMA is in Mekinock Township, approximately 5 miles to the northeast of the installation. This WMA contains 3,471 acres with habitat for deer, sharptails, and pinnated grouse (USGS 2006).

***North Dakota Game and Fish WMA.*** Located in Mekinock Township, three separate areas are considered to the North Dakota Game and Fish WMA, including the area within the installation boundary in the northwestern corner, approximately 3 miles north of the northwestern corner, and to the south of the Mekinock Prairie Chicken Preserve.

***Crawford Oakville Prairie WMA.*** The Crawford Oakville Prairie WMA is 160 acres and is 3 miles east and 2 miles south of Emerado. This WMA contains habitat for deer and sharptails (USGS 2006). This rare, tallgrass prairie land was donated to the North Dakota Game and Fish Department by residents of the County of Grand Forks. The WMA is managed for native prairie, wildlife, public hunting, and other compatible uses (NDGFD 2007).

***Turtle River State Park.*** Situated on the meandering Turtle River, the 784-acre Turtle River State Park is in a wooded valley approximately 3 miles west of the installation. The Turtle River is stocked with rainbow trout, the park offers year-round recreational activities (NDPRD undated).

***Kellys Slough NWR.*** Covering portions of Blooming, Lakeville, and Rye townships of Grand Forks County, the 1,867 acre NWR is approximately 2 miles east of the installation. An intermittent stream traversing through Kellys Slough NWR flows into Turtle River.

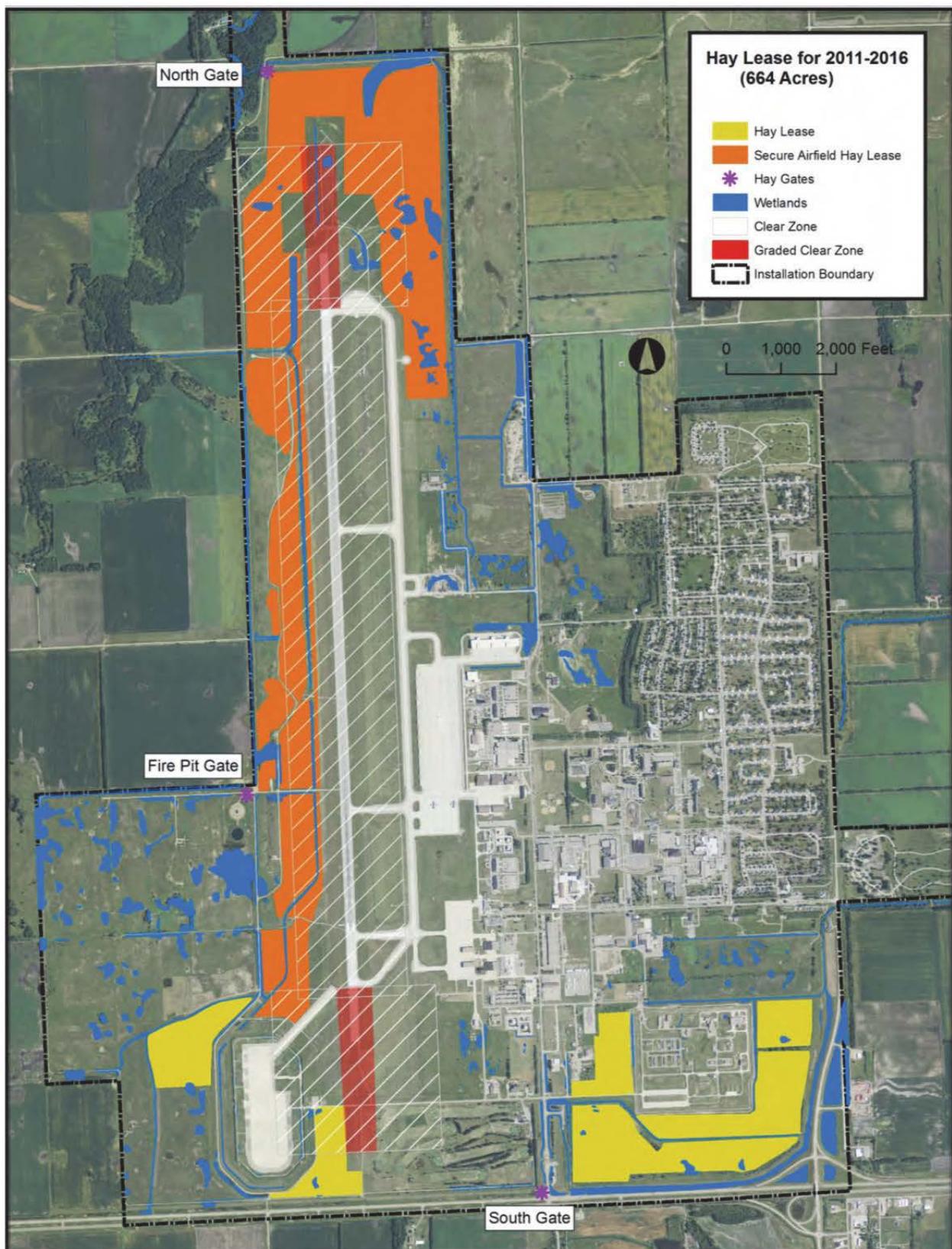


Figure 3-1. Hay Lease Map for Grand Forks AFB, 2011 to 2016

### 3.1.3 Environmental Consequences

#### Evaluation Criteria

The significance of potential land use effects is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. A proposed action could have a significant effect with respect to land use if any the following were to occur:

- Be inconsistent or in noncompliance with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

### 3.1.4 Proposed Action

Implementation of the Proposed Action would not be expected to result in adverse impacts on land use. The Proposed Action would be in compliance with the 2006 *General Plan: Grand Forks Air Force Base, ND*. Implementation of the Proposed Action would not require a change in land use or land use policies at Grand Forks AFB or the surrounding areas. The Proposed Action would not preclude the viability of existing adjacent land uses or future plans. Implementation of the Proposed Action would not impact any established Explosives Safety Quantity-Distance (QD) arcs of aircraft accident potential zones. No impacts on on- or off-installation land use would be expected from implementation of the Proposed Action.

### 3.1.5 No Action Alternative

Under the No Action Alternative, existing land use conditions would remain the same as described in Section 3.2. No impacts would be expected.

## 3.2 Air Quality

### 3.2.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ), or micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin,” and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone ( $\text{O}_3$ ), carbon monoxide (CO), nitrogen dioxide

(NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM<sub>10</sub>] and particulate matter equal to or less than 2.5 microns in diameter [PM<sub>2.5</sub>]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. North Dakota has adopted a more stringent set of standards, termed the North Dakota Ambient Air Quality Standards (NDAAQS). **Table 3-1** presents the primary and secondary USEPA NAAQS and NDAAQS.

Although O<sub>3</sub> is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because O<sub>3</sub> is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or “O<sub>3</sub> precursors.” These O<sub>3</sub> precursors consist primarily of nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O<sub>3</sub> concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO<sub>2</sub>. As authorized by the CAA, USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels.

These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O<sub>3</sub>, PM<sub>2.5</sub>, and regional haze standards that were promulgated in that year. The 1-hour O<sub>3</sub> standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour O<sub>3</sub> NAAQS. The effective designation date for most areas was June 15, 2004. USEPA designated PM<sub>2.5</sub> nonattainment areas in December 2004, and finalized the PM<sub>2.5</sub> implementation rule in January 2005. No county in the state of North Dakota was identified as being nonattainment for the PM<sub>2.5</sub> standard.

On 22 September 2009, the USEPA issued a final rule for mandatory greenhouse gas (GHG) reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide (CO<sub>2</sub>) and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO<sub>2</sub> equivalent per year. The first emissions report was due in 2011 for 2010 emissions. GHG emissions will become factors in Prevention of Significant Deterioration (PSD) and Title V permitting and reporting, according to a USEPA rulemaking issued on 3 June 2010 (75 Federal Register [FR] 31514). GHG emissions thresholds of significance for permitting of stationary sources are 75,000 tons CO<sub>2</sub> equivalent per year and 100,000 tons CO<sub>2</sub> equivalent per year under these permit programs. GHGs became regulated pollutants under the CAA for purposes of air permitting in January 2011. The installation is not required to report GHG emissions since they emit less than 25 metric tons of CO<sub>2</sub> per year (2008, 23 metric tons of CO<sub>2</sub>; 2009, 17 metric tons of CO<sub>2</sub>; and, 2010, 16 metric tons of CO<sub>2</sub> from stationary sources).

This implementation plan describes specific actions DoD will take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 GHG

Table 3-1. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	State	
CO	8-hour <sup>(1)</sup>	9 ppm (10 mg/m <sup>3</sup> )	Same	None
	1-hour <sup>(1)</sup>	35 ppm (40 mg/m <sup>3</sup> )	Same	None
Pb	Rolling 3-Month Average <sup>(2)</sup>	0.15 µg/m <sup>3</sup> <sup>(3)</sup>	Same	Same as Primary
NO <sub>2</sub>	Annual <sup>(4)</sup>	53 ppb <sup>(5)</sup>	Same	Same as Primary
	1-hour <sup>(6)</sup>	100 ppb	--	None
PM <sub>10</sub>	24-hour <sup>(7)</sup>	150 µg/m <sup>3</sup>	Same	Same as Primary
PM <sub>2.5</sub>	Annual <sup>(8)</sup>	15 µg/m <sup>3</sup>	Same	Same as Primary
	24-hour <sup>(6)</sup>	35 µg/m <sup>3</sup>	Same	Same as Primary
O <sub>3</sub>	8-hour <sup>(9)</sup>	0.075 ppm <sup>(10)</sup>	Same	Same as Primary
SO <sub>2</sub>	1-hour <sup>(11)</sup>	75 ppb <sup>(12)</sup>	0.273 ppm	None
	3-hour <sup>(1)</sup>	--	0.5ppm	0.5 ppm

Sources: USEPA 2011, NDDH 2011c

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Not to be exceeded.
3. Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m<sup>3</sup> as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
4. Annual Mean.
5. The official level of the annual NO<sub>2</sub> standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
6. 98th percentile, averaged over 3 years.
7. Not to be exceeded more than once per year on average over 3 years.
8. Annual mean, averaged over 3 years.
9. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
10. Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
11. 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
12. Final rule signed June 2, 2010. The 1971 annual (0.3 ppm) and 24-hour (0.14 ppm) SO<sub>2</sub> standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Key: ppm = parts per million; ppb = parts per billion; mg/m<sup>3</sup> = milligrams per cubic meter; µg/m<sup>3</sup> = micrograms per cubic meter

emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 GHG emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG emissions goals in the DoD SSPP include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to FY 2008 emissions, and reducing Scope 3 GHG emissions by 13.5 percent by 2020, relative to FY 2008 emissions.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, installation, or activity) that has the potential to

emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs.

Federal PSD regulations apply in attainment areas to major stationary sources (e.g., sources with the potential to emit 250 tpy of any criteria pollutant) and significant modifications to major stationary sources (e.g., change that adds 0.6 tpy for lead, or 10 tpy to 100 tpy depending on the criteria pollutant, to the facility's potential to emit). Additional PSD permitting thresholds apply to increases in stationary source GHG emissions. PSD permitting can also apply to a proposed project that is a modification with a net emissions increase to an existing PSD major source and (1) the proposed project is within 10 kilometers of national parks or wilderness areas (i.e., Class I Areas), and (2) regulated stationary source pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1  $\mu\text{g}/\text{m}^3$  or more (40 CFR 52.21[b][23][iii]). PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's class designation (40 CFR 52.21[c]) (USEPA 2009a). PSD regulations do not apply to the Proposed Action and are not discussed further in this EA because Grand Forks AFB is not an existing PSD major source and no Class I areas are within 10 kilometers from the installation.

### 3.2.2 Existing Conditions

Grand Forks AFB and the surrounding areas proposed for control of nuisance species are in Grand Forks County, which is within the North Dakota Air Quality Control Region (AQCR) 172. AQCR 172 consists of all counties in North Dakota with the exception of Metropolitan Fargo, North Dakota. As defined in 40 CFR 81.335, Grand Forks County is designated as in attainment/unclassifiable for all criteria pollutants (USEPA 2010).

The most recent emissions inventories for Grand Forks County and AQCR 172 are shown in **Table 3-2**. Grand Forks County is considered the local area of influence, and AQCR 172 is considered the regional area of influence for the air quality analysis.

**Table 3-2. Local and Regional Air Emissions Inventory**

	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)	PM <sub>2.5</sub> (tpy)
Grand Forks County, ND	3,786	2,952	22,947	1,381	12,711	2,034
AQCR 172	36,630	16,704	118,068	5,576	145,387	23,540

Source: USEPA 2009a

The U.S. Department of Energy, Energy Information Administration, estimates that gross CO<sub>2</sub> emissions in North Dakota were 53 million metric tons in 2008 (EIA 2010).

The NDDH regulates air quality for the State of North Dakota. Grand Forks AFB is classified as a major source of emissions and has an Air Pollution Control Title V Permit to Operate (NDDH 2007). As required by the NDDH, Grand Forks AFB calculates annual criteria pollutant emissions from stationary sources and provides this information to the NDDH. There are various sources on-installation that emit criteria pollutants and HAPs, including generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coatings/paint booths, and miscellaneous chemical usage.

### 3.2.3 Environmental Consequences

#### Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS “attainment” areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any evaluation criteria established by a SIP or permit limitation
- Produce emissions representing an increase of 100 tpy for any attainment criteria pollutant (i.e., NO<sub>x</sub>, VOCs, CO, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>), unless the proposed activity qualifies for an exemption under the Federal General Conformity Rule.

Although the 100 tpy threshold is not a regulatory driven threshold, it is being applied as a conservative measure of significance in attainment areas. The rationale for this conservative threshold is that it is consistent with the highest General Conformity *de minimis* levels for nonattainment areas and maintenance areas. In addition, it is consistent with Federal stationary source major source thresholds for Title V permitting that formed the basis for the nonattainment *de minimis* levels.

### 3.2.4 Proposed Action

Short- and long-term, negligible to minor, adverse impacts on air quality would be anticipated from the Proposed Action. The Proposed Action would generate emissions of criteria pollutants as some of the pesticides and herbicides contain VOCs. Such activities are not expected to cause adverse impacts on air quality, provided they are operated and maintained in a manner consistent with good engineering practices and label instructions. Operation of vehicles and equipment to remove vegetation would result in short-term emissions of criteria pollutants as combustion products. Emissions of all criteria pollutants would result from combustion of fuels from contractor commuter emissions. Emissions associated with the Proposed Action would not be expected to result in adverse effects on air quality, as there would be no violation of the CAA or the NAAQS.

Spray equipment would be adjusted so that the volume median diameter produced is less than 60 microns and that 90 percent of the spray is contained in droplets smaller than 115 microns. On average, droplet size for application of pesticides would be about 50 microns. Pesticide and herbicide application rates would be followed based on the associated labels (see **Tables 2-1 and 2-2** and **Appendix B**), and a current DoD Pesticide Applicator Certification or state pesticide certification would be required for all personnel applying pesticides. Application of all aerial pesticides would be consistent with AFI 32-1074, *Aerial Application of Pesticides*.

Depending on climatological conditions, droplets from aerial application would settle to the earth in a few hours. There would be temporary increases in VOCs and NO<sub>x</sub> within the proposed treatment area as a result of the Proposed Action. However, this activity would not exceed local standards for air emissions and would not result in nonconformance with the CAA and its amendments. It is recognized that ULV sprays can be inhaled by humans and other vertebrates. Residents would be notified of spray timing to minimize undue inhalation and dermal exposure. Careful attention would also be paid by the applicators to avoid drift into non-target areas. In summary, the aerial spraying of pesticides would only temporarily

affect the local air quality. All of these materials settle to the ground, water, or vegetative substrate within hours, where they begin to biodegrade and hydrolyze. Larvicides would be applied in such a manner that no impacts would be anticipated on air quality because droplets are intended to be large enough that they immediately fall into the water column to effect mosquito larvae in the water.

None of the chemical products associated with the Proposed Action would contain GHGs. A minor contribution of GHGs would be anticipated through the combustion of fossil fuels associated with the use of vehicles and equipment to control vegetation. This contribution would be negligible when compared to the current vegetation control activities.

Implementation of an integrated approach to mosquito control could, in time, reduce the need for aerial application of pesticides by trapping mosquitoes, removing areas of standing water where mosquito-breeding activity occurs, and by applying larvicides in a manner consistent with the guidelines provided in the MMP. Therefore, long-term, beneficial impacts on air quality could occur if the frequency of chemical application is reduced over time. All emissions associated with the Proposed Action would be temporary in nature. Therefore the Proposed Action would not have significant effects on regional or local air quality.

### **3.2.5 No Action Alternative**

Under the No Action Alternative, the Proposed Action would not be implemented. If source reduction of mosquitoes is not a component of mosquito management, it is possible that the frequency of aerial or ground application of pesticides and herbicides could increase.

## **3.3 Geological Resources**

### **3.3.1 Definition of the Resource**

Geology is the study of the Earth's processes and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Geological resources consist of the Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology.

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Prime farmland is protected under the Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that

Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland.

The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action is based on preparation of the farmland conversion impact rating form AD-1006 for areas where prime farmland soils occur and by applying criteria established at Section 658.5 of the FPPA (7 CFR Part 658). The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, July 5, 1984).

### **3.3.2 Existing Conditions**

#### **Grand Forks AFB**

**Regional Geology.** Grand Forks AFB and the surrounding areas are in the Central Lowland Physiographic Province along the flat former glacial Lake Agassiz Plain. Bedrock strata dip gently towards the center of the Williston Structural Basin in the west (USAF 2006). Precambrian-aged bedrock (4.5 billion to 543 million years before present) is overlain by 130 feet of glacial till and 95 feet of lacustrine deposits. The glacial deposits are composed of silts and clays with occasional sand and gravel lenses (CBP 2008).

**Topography.** Grand Forks AFB is characterized by flat to gently sloped topography, with a northeastward slope of about 1.5 to 2 feet per mile on the installation (CBP 2008). Across the installation, elevations range from 900 feet above mean sea level (MSL) on the western side to 880 feet above MSL on the eastern side.

**Soils.** Grand Forks AFB is underlain by six loamy soil associations with varying amounts of sand: the Antler-Gilby-Svea, the Bearden-Antler, the Glyndon-Gardena, the Delle-Cashel, the Ojata, and the Wyndmere-Tiffany-Arveson (GFAFB 2003d). Soils at Grand Forks AFB are deep, fairly level, and somewhat poorly to moderately well-drained with a high shrink-swell potential (CBP 2008). These soils are also highly susceptible to wind erosion. Soil is loamy from 0 to 12 inches below ground surface (bgs); loam, silty loam, and very fine sandy loam from 12 to 26 inches bgs; and loam to clayey loam from 26 to 60 inches bgs (GFAFB 2007b).

**Prime Farmland.** Of the six soil units mapped within Grand Forks AFB, three are considered prime farmland soils (Antler-Gilby-Svea, Glyndon-Gardena, and Delle-Cashel) and one is considered prime farmland soil if drained (Wyndmere-Tiffany-Arveson) (NRCS 2011).

#### **Off-Installation Properties**

**Regional Geology.** Regional geology would be similar to that described for Grand Forks AFB, with Precambrian-aged bedrock overlain with glacial till.

**Topography.** Off-installation, topography ranges from 825 to 984 feet above msl, with elevation generally increased to the west. Elevation at Kellys Slough NWR ranges from 825 to 845 feet and Prairie Chicken WMA ranges from approximately 855 to 870 feet, sloping to the southwest. Elevation at Turtle River State Park is approximately 984 feet, and is approximately 850 feet at Crawford Oakville Prairie WMA (Anyplace America undated, Terra Server 2010).

**Soils.** Off-installation soils are composed primarily of loam (see **Table 3-3**). Approximately 70 percent of soils mapped at Kellys Slough NWR consist of the Lallie silty clay loam, the Zell-LaDelle silt loam, and the Bearden silty clay loam. Approximately 60 percent of the Crawford Oakville Prairie WMA is mapped as Antler silty clay loam, and 56 percent of the Turtle River State Park is mapped as Buse-Svea loam (1 to 25 percent slope) and Velva sandy loam (0 to 6 percent slope). The Bearden silty clay loam composes approximately 60 percent of the Mekinock Prairie Chicken WMA. The North Dakota Game and Fish WMA is primarily mapped as Bearden silty clay loam (56 percent) and Ojata silty clay loam (40 percent) (NRCS 2011).

**Prime Farmland.** Prime farmland status for each mapped soil unit is shown in **Table 3-3**. Out of the 30 soil units mapped off-installation, 11 are considered to be prime farmland, 5 are farmland of statewide importance, and 3 are prime farmland if drained.

**Table 3-3. Off-Installation Soils**

Soil Unit	Type	Prime Farmland Classification	Location
Antler	silty clay loam, saline	None	Crawford Oakville Prairie WMA
Antler	silt loam	Prime farmland	Turtle River State Park
Antler-Mustinka	sily clay loam, saline, 0 to 2 percent slope	Prime farmland if drained	Crawford Oakville Prairie WMA
Arveson	loam	Prime farmland if drained	Turtle River State Park
Arvilla	sandy loam, 1 to 6 percent slope	None	Turtle River State Park
Bearden	silty clay loam, saline	None	Kellys Slough NWR, Crawford Oakville Prairie WMA, Mekinock Prairie Chicken WMA, ND Game and Fish WMA
Bearden-Overly	silty clay loam, 0 to 2 percent slope	Prime farmland	Kellys Slough NWR
Buse-Svea	loam, 1 to 15 percent slope	Farmland of statewide importance	Turtle River State Park
Buse-Svea	loam, 1 to 25 percent slope	Farmland of statewide importance	Turtle River State Park
Divide	loam, 1 to 3 percent slope	Prime farmland	Turtle River State Park
Embden	fine sandy loam, 2 to 6 percent slope	Prime farmland	Turtle River State Park
Gardena	silt loam, 0 to 2 percent slope	Prime farmland	Crawford Oakville Prairie WMA, ND Game and Fish WMA
Gilby	loam	Prime farmland	Turtle River State Park
Glyndon	silt loam, 0 to 1 percent slope	Prime farmland	Mekinock Prairie Chicken WMA, ND Game and Fish WMA

<b>Soil Unit</b>	<b>Type</b>	<b>Prime Farmland Classification</b>	<b>Location</b>
Hecla-Maddock	fine sandy loam, 2 to 6 percent slope	None	Turtle River State Park
Lallie	silty clay loam, ponded	None	Kellys Slough NWR
Lamoure	silty clay loam, channeled, 0 to 6 percent slope	None	Turtle River State Park
Maddock	sandy loam, 9 to 25 percent slope	None	Turtle River State Park
Ojata	silty clay loam	None	Kellys Slough NWR, Crawford Oakville Prairie WMA, Mekinock Prairie Chicken WMA, ND Game and Fish WMA
Overly	silty clay loam, 0 to 2 percent slope	Prime farmland	Kellys Slough NWR, Turtle River State Park
Rauville	silt loam, channeled, 0 to 6 percent slope	None	Turtle River State Park
Renshaw	loam, 1 to 3 percent slope	None	Crawford Oakville Prairie WMA, Turtle River State Park
Sioux	loam, 1 to 15 percent loam	None	Turtle River State Park
Svea	loam, 0 to 3 percent slope	Prime farmland	Turtle River State Park
Towner	fine sandy loam, 1 to 3 percent	Farmland of statewide importance	Turtle River State Park
Vallers	loam	Prime farmland if drained	Turtle River State Park
Velva	sandy loam, channeled, 0 to 6 percent slope	None	Turtle River State Park, ND Game and Fish WMA
Zell-LaDelle	silt loam, 1 to 6 percent slope	Prime farmland	Kellys Slough NWR
Zell-LaDelle	silt loam, 1 to 9 percent slope	Farmland of statewide importance	Kellys Slough NWR, Turtle River State Park
Zell-LaDelle	silt loam, 1 to 15 percent slope	Farmland of statewide importance	Kellys Slough NWR

Source: NRCS 2011

### 3.3.3 Environmental Consequences

#### Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development. A proposed action could have a significant effect with respect to geological resources if any the following were to occur:

- Alteration of the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability
- Changes to the soil composition, structure, or function within the environment.

Minimization of soil erosion is considered when evaluating potential effects of a proposed action on soil resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development. Effects on soils (including prime farmland soils) would be significant if they would alter the soil composition, structure, or function within the environment.

### 3.3.4 Proposed Action

#### Grand Forks AFB

It is anticipated that short-term, negligible to minor, and long-term, negligible, adverse impacts on soil would occur from the Proposed Action. Short-term, negligible to minor, adverse impacts would be anticipated from chemical applications (e.g., insecticides and herbicides), as some chemicals adsorb strongly to soil, and soil chemistry could be altered temporarily until the chemicals have adequately degraded from microbial action.

Long-term, negligible impacts would be expected from compaction of soils under the weight of vehicles and other equipment during vegetation-removal activities, such as to clear drainage ditches. Compaction of soils would result in a disturbance to and modification of soil structure. Soil productivity, which is the capacity of the soil to produce vegetative biomass, would decline in disturbed areas. Loss of soil structure due to compaction from foot and vehicle traffic could result in changes in drainage patterns. However, many of the areas where drainage ditches are located are disturbed, and therefore little impact would occur under the Proposed Action due to soil compaction or changes in drainage patterns.

Although soils mapped on the installation are considered to be prime farmland soils, implementation of the Proposed Action would not be expected to preclude these soils from current or future agricultural production. No prime farmland soils would be removed or converted as a result of the Proposed Action. Therefore, no impacts would be anticipated on prime farmland soils. No impacts on geology or topography would be anticipated.

BMPs, including installation of silt fencing and hay bales, in addition to implementation of erosion-and-sediment-control plans, would reduce the impact of the Proposed Action on geological resources to negligible.

**Larval Mosquito Chemical Control.** Impacts on soil would be short-term, negligible, and adverse. No long-term impacts on soils would be anticipated. Altosid® (active ingredient [A.I.] methoprene) in liquid or briquette form rapidly degrades due to exposure to sunlight or through microbial action. Methoprene rapidly binds to soil particles and does not leach into deeper soil horizons or groundwater (Cornell University 1995). When Altosid® was applied at an extremely high application rate of 1 pound per acre, its half-life was less than 10 days. *Bti*, the active ingredient in Vectobac® granules, is a naturally occurring bacterium found in soils.

**Adult Mosquito Chemical Ground Control.** Mavrik® (A.I. fluvalinate) degrades quickly in soils, with a typical half-life of 4 to 8 days under aerobic conditions in loams and clays. However, it has a strong tendency to bind to soil particles (Cornell University 1996). Anvil® Kontrol 4-4, and Duet™ are synthetic pyrethroids. Pyrethroids readily bind to soil particles and therefore do not contaminate groundwater (NYCHMH 2012). They are eventually broken down by microorganisms in soil and water (ATSDR 2003).

Use of the chemical controls associated with the Proposed Action for adult mosquitoes would result in short-term, negligible to minor, adverse impacts on soil as the chemicals bind to soil particles. Long-term, beneficial impacts could occur from increased soil productivity as the microbial food web is expanded.

**Noxious and Invasive Weed Control.** Short-term, negligible impacts could occur after weedy vegetation has died but before other vegetation has become established, as soil could be more susceptible to erosion and sedimentation before vegetation is reestablished. Long-term, beneficial impacts on soil productivity could occur in areas where pesticides are broken down by microbial action, thereby providing additional sources to the microbial soil food web.

## Off-Installation Properties

Impacts on off-installation properties would be similar to those described for Grand Forks AFB and would be short-term, minor, and adverse from the aerial application of Altosid® liquid larvicide and continued use of Trumpet liquid adulticide.

### 3.3.5 No Action Alternative

Under the No Action Alternative, there would be no change from existing conditions at the installation, as described in **Section 3.3.2**. No impacts on geology or soil resources would be anticipated.

## 3.4 Water Resources

### 3.4.1 Definition of the Resource

Water resources are natural and man-made sources of water that are available for use by and for the benefit of humans and the environment. Water resources relevant to Grand Forks AFB's location in North Dakota include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes. Hydrology concerns the distribution of water-to-water resources through the processes of evapotranspiration, atmospheric transport, precipitation, surface runoff and flow, and subsurface flow. Hydrology results primarily from temperature and total precipitation that determine evapotranspiration rates, topography that determines rate and direction of surface flow, and soil and geologic properties that determine rate of subsurface flow and recharge to the groundwater reservoir.

Wetlands are important natural systems and habitats because of the diverse biological and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, unique plant and wildlife habitat provision, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The USACE defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 329). Wetland habitat is discussed in **Section 3.5.1**, Biological Resources.

North Dakota relies on CWA Section 401 water quality certification as its primary form of state-level wetlands regulation. The Section 401 program is administered by the NDDH/DWQ. In making certification decisions, the NDDH/DWQ is primarily concerned with the construction and environmental disturbance requirements pertaining to soils, surface waters, and fill materials. A nonregulatory agency policy document requires that “fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.” If a project does not meet this and other minimum requirements of the NDDH/DWQ, the permit is denied, and necessary conditions are communicated before re-application (ELI 2008).

**Groundwater.** Groundwater is water that exists in the saturated zone beneath the earth’s surface in pore spaces and fractures, and includes aquifers. Groundwater is recharged through percolation of water on the ground’s surface (e.g., precipitation and surface water bodies) and upward movement of water in lower aquifers through capillary movement. Groundwater is an essential resource that can be used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. The interface between the groundwater potentiometric surface (i.e., depth to groundwater below ground surface) and surface topography often results in streams, rivers, and lakes.

Groundwater quality and quantity are regulated under several different programs. The Federal Underground Injection Control regulations, authorized under the Safe Drinking Water Act (SDWA), require a permit for the discharge or disposal of fluids into a well. The Federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply.

**Surface Water.** Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contribution to the economic, ecological, recreational, and human health of a community or locale. Waters of the United States are defined within the Clean Water Act (CWA), as amended, and jurisdiction is addressed by the USEPA and the USACE. These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into waters of the United States including wetlands. Encroachment into waters of the United States and wetlands requires permits from the state and the Federal government. Wetland hydrology is discussed within this section. **Section 3.5.2** provides a discussion of wetland habitat occurring within the action areas and adjacent wetlands that might be affected by the actions being considered.

Per Section 401 of the CWA, any applicant for a Federal license or permit to conduct any activity including the construction or operation of facilities, which could result in any discharge into the navigable

waters, shall provide the licensing or permitting agency a certification from the state in which the discharge originates or will originate. North Dakota relies on Section 401 water quality certification as its primary form of state-level wetlands regulation. The Section 401 program is administered by the North Dakota Department of Health/Division of Water Quality (NDDH/DWQ). In making certification decisions, the NDDH/DWQ is primarily concerned with the construction and environmental disturbance requirements pertaining to soils, surface waters, and fill materials. A nonregulatory agency policy document requires that “fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.” If a project does not meet this and other minimum requirements of the NDDH/DWQ, the permit is denied, and necessary conditions are communicated before reapplication (ELI 2008).

On 31 October 2011, the USEPA issued a final National Pollutant Discharge Elimination System (NPDES) PGP for point-source discharges from the application of pesticides to waters of the United States. As a result of the court’s decision, NPDES permits are generally required for these types of discharges as of 31 October 2011. The PGP covers operators that apply pesticides that result in discharges from the following use patterns: (1) mosquito and other flying insect pest control; (2) weed and algae control; (3) animal pest control; and (4) forest canopy pest control. The permit requires permittees to minimize pesticide discharges through the use of pest management measures, and to monitor for and report any adverse incidents (USEPA 2012).

A water body can be deemed impaired if water quality analyses conclude that exceedances of the water quality standards established by the CWA occur. The CWA requires that states establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the source(s) causing the impairment. A TMDL is the maximum amount of a substance that can be assimilated by a water body without causing impairment. The CWA also mandated the NPDES program, which regulates the discharge of point (end of pipe) and nonpoint (storm water) sources of water pollution and requires a permit for any discharge of pollutants into waters of the United States.

Storm water (water from precipitation events) is an important component of surface water systems because of its potential to introduce sediments and other contaminates that could degrade surface waters. Proper storm water flow management, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics. Prolonged increases in storm water volume and velocity associated with development and increased impervious surfaces has potential to impact adjacent streams as a result of stream bank erosion and channel widening or down cutting associated with the adjustment of the stream to the change in flow characteristics. Storm water management systems are typically designed to contain runoff on site during construction, and to maintain predevelopment storm water flow characteristics following development through either the application of infiltration or retention practices. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event often leads to downstream flooding and the environmental and economic damages associated with flooding.

The USEPA published the technology-based Final Effluent Limitations Guidelines (ELGs) and New Performance Standards for the Construction and Development point sources, known as the “Construction and Development (C&D) Rule,” on 1 December 2009, to control the discharge of pollutants from construction sites. The C&D Rule became effective on 1 February 2010, and requires construction site operators to meet restrictions on erosion and sediment control, pollution prevention, and stabilization. The C&D Rule also included a numeric turbidity limit for certain larger construction sites, but effective 4 January 2011, the USEPA has suspended the numeric limitation for further evaluation. Therefore, the numeric turbidity limitation and monitoring requirements do not currently have to be incorporated into construction permits. The USEPA currently regulates large and small (greater than 1 acre) construction

activities through the final 2012 CGP (16 February 2012), which recently replaced the 2008 CGP. The 2012 CGP includes a number of modifications to the 2008 CGP, many of which are necessary to implement the new ELGs and New Source Performance Standards for C&D point sources. Permittees must select, install, and maintain effective erosion-and-sedimentation-control measures as identified and as necessary to comply with the 2012 CGP, including the following:

- Minimize exposure of soils and control discharges from stockpiled sediment or soil.
- Design storm water controls according to the amount, frequency, intensity, and duration of precipitation; the nature of storm water runoff and run-on at the site; and the range of soil particle sizes expected to be present on the site.
- Direct discharges from storm water controls to vegetated areas to increase sediment removal and maximize storm water infiltration.
- Complete installation of storm water controls by the time each phase of earth-disturbance has begun, unless infeasible.
- Install sediment controls (e.g., sediment basins, sediment traps, silt fences, and vegetative buffer strips) along the perimeter of the construction site.
- Regularly inspect and maintain all erosion and sediment controls.
- Prevent discharges of petroleum products; soaps, solvents or detergents used in equipment washing; or other toxic or hazardous substances from a spill or other release.
- Minimize sediment track-out and implement dust controls.
- Minimize disturbance of steep slopes.
- Preserve topsoil.
- Minimize soil compaction.
- Design storm water conveyance channels to avoid unstabilized areas on the site and to reduce erosion; minimize erosion of channels and their embankments, outlets, and downstream waters.

Construction activities, such as clearing, grading, trenching, and excavating, disturb soils and sediment. If not managed properly, disturbed soils and sediments can easily be washed into nearby water bodies during storm events, where water quality is reduced. Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. 17094) establishes into law new storm water design requirements for Federal construction projects that disturb a footprint of greater than 5,000 square feet ( $\text{ft}^2$ ) of land. EISA Section 438 requirements are independent of storm water requirements under the CWA. The project footprint consists of all horizontal hard surface and disturbed areas associated with project development. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology shall be modeled or calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate storm water retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible. Post-construction analyses would be conducted to evaluate the effectiveness of the as-built storm water reduction features (DoD 2010a). These regulations have been incorporated into applicable DoD Unified Facilities Criteria (UFC) in April 2010, which stated that low-impact development (LID) features would need to be incorporated into new construction activities to comply with the restrictions on storm water management promulgated by EISA Section 438. LID is a storm water management strategy designed to maintain site hydrology and mitigate the adverse impacts of storm water runoff and nonpoint source pollution. LID features can manage the increase in runoff between pre- and post-development conditions on the project

site through interception, infiltration, storage, or evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of the methods include bioretention, permeable pavements, cisterns/recycling, and green roofs (DoD 2010b). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (USEPA 2009b).

**Floodplains.** Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. The living and nonliving parts of natural floodplains interact with each other to create dynamic systems in which each component helps to maintain the characteristics of the environment that support it. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and diversification of plants and animals. Floodplains provide a broad area to spread out and temporarily store floodwaters. This reduces flood peaks and velocities and the potential for erosion. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body (FEMA 1986).

Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, the size of the watershed above the floodplain, and upstream development. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year. Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a 100-year floodplain. This determination typically involves consultation of FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains to the maximum extent possible wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions:

- Acquiring, managing, and disposing of Federal lands and facilities
- Providing federally undertaken, financed, or assisted construction and improvements
- Conducting Federal activities and programs affecting land use, including water and related land resources planning, regulation, and licensing activities.

**Wetlands and other Waters of the United States.** The USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 329). Wetlands perform several hydrologic functions including water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands).

EO 11990, *Protection of Wetlands* (24 May 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in jurisdictional or nonjurisdictional wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands. In accordance with 32 CFR Part 989.14, a FONPA must accompany the FONSI when the alternative selected could be in wetlands or floodplains, and must discuss why no other practicable alternative exists to avoid impacts.

Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into jurisdictional waters of the United States. Section 404 permits are issued by the USACE. Waters of the United States include jurisdictional interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

### 3.4.2 Existing Conditions

#### Grand Forks AFB

**Groundwater.** Groundwater within Grand Forks County is found in bedrock and overlying unconsolidated glacial drift deposits. Bedrock aquifers include rocks from the Dakota Group from the Ordovician Period (approximately 490 to 445 million years ago), and the overlying Pierre Formation from the Cretaceous Period (approximately 145 to 65 million years ago). Grand Forks County is part of a large artesian discharge area and groundwater primarily flows from west to east (GFAFB 2011, NDGS 1970).

The Ordovician Red River Formation is the deepest aquifer in Grand Forks County. Water yield varies depending on joints, fractures, and solution cavities within the formation, and the groundwater is generally very saline. Above the Red River Formation aquifer is the Dakota Group aquifer, which is the principal groundwater aquifer among the Great Plains states. Groundwater is present within the Dakota Group at about 100 to 200 feet bgs. This aquifer is confined and under pressure, delivering groundwater to wells at rates ranging from 2 to 50 gallons per minute (gpm). Water in the Dakota Group aquifer is primarily used for livestock because it is considered unsuitable for domestic consumption or industrial use due to its high salinity. The water level within the aquifer has dropped nearly 20 feet in the past several years due to an increase in aquifer use for agricultural purposes (GFAFB 2011).

The Emerado Aquifer is the uppermost aquifer at 50 to 75 feet bgs. Groundwater is confined under an artesian head, and well yields can vary from rates of 50 to 500 gpm. Water quality within the aquifer is poor, with high levels of dissolved solids and high salinity, which potentially attribute to upward seepage of groundwater from bedrock aquifers (GFAFB 2011). Potable water for the installation is obtained from surface water sources including the Red River and Red Lake River through the City of Grand Forks (GFAFB 2011).

**Surface Water.** Surface water surrounding Grand Forks AFB includes rivers, streams, and numerous wetlands (see **Figure 3-2**). Grand Forks AFB is within the Red River Basin, which drains 48,490 square miles of land. Glacial lakes occupied the Red River Basin until the end of glaciation in North Dakota about 12,000 years ago, with Lake Agassiz as the last glacial lake present in the basin. Tributaries within the Red River Basin typically have relatively steep upper reaches that spill into the flat valley floor in the former lakebed of Lake Agassiz (USACE 2011).

The Turtle River is the only primary body of water present on Grand Forks AFB; however, Kellys Slough, within the Kellys Slough NWR, is approximately 2 miles east of the installation. Just beyond the southern boundary of the installation is Hazen Brook, which flows to the east along the southern side of U.S. Highway 2. Turtle River and Kellys Slough are jurisdictional water of the United States; the jurisdictional status of Hazen Brook is unknown.

The Turtle River flows through the northwestern corner of the installation boundary, meandering in a northeasterly direction. It eventually empties into Lake Winnipeg in Canada via the Red River within the Red River Drainage Basin. Turtle River is part of the 685-square-mile Turtle River Watershed in northeastern North Dakota (GFCSCD 2011). Within the boundaries of Grand Forks AFB, Turtle River flows for approximately 3,666 feet (RRRC 2006). Peak flows occur in April, consistent with spring thaw, and minimum flows occur in January and February. Flows are managed in this river by the flood-control structure in Larimore, North Dakota.

Turtle River has been classified as a Class 2 stream by the NDDH, with water quality sufficient to sustain fish populations and is suitable for irrigation and recreational purposes (GFAFB 2007c). However, the river has been placed on North Dakota's 2010 Section 303(d) priority waterbody list due to elevated cadmium, selenium, and sediment/siltation (NDDH 2010b). TMDLs have not yet been determined for these constituents. Most of the impairments to Turtle River are caused or influenced by streambank and channel erosion and can be improved through the establishment of a proper functioning riparian corridor (RRRC 2006). However, because of these impairments, the river has been deemed fully supporting, but threatened, with respect to fish and other aquatic biota, municipal and domestic uses, and recreation (NDDH 2010b). Trash and large woody debris are also present throughout this reach of the river.

During a 2006 streambank morphology study of Turtle River conducted by the Red River Regional Council (RRRC), it was determined that high flood flow intensified erosion by removing streambank sediment. Over time, as the climate has become wetter, the Turtle River channel has widened and cut down into the streambed. The river is entrenched for short lengths within the Grand Forks AFB boundaries, with some of these sections possibly attenuating back to natural conditions with more stable banks. Severe erosion was found outside of meanders, especially where vegetation was sparse. The study also identified deep scour holes, riffles, and pools, with depths of at least 3 feet. The average water depth ranges from 1 to 3 feet during summer months when water levels are low. Bankfull depths typically correspond to a depth where the channel fills to the point at which it would spill onto the floodplain. Within the stretch of Turtle River that flows through the installation, bankfull depths ranged from 2 to 4 feet (RRRC 2006).

The other prominent nearby surface water feature, Kellys Slough, is within a wide, marshy floodplain. Surface water runoff is received from the eastern half of Grand Forks AFB and effluent is received from water treatment lagoons maintained by Grand Forks AFB to the east of the installation. Drainage from Kellys Slough flows to the northeast into the Turtle River and eventually into the Red River. The Red River is approximately 15 miles from Grand Forks AFB and runs beyond the eastern portion of the installation. The Red Lake River supplies a portion of the drinking water supply to Grand Forks AFB.

Storm water drainage at Grand Forks AFB occurs through four drainage ditches (southeast, northeast, northwest, and west) and nine outfalls. The outfalls carry drainage into Kellys Slough and eventually into Turtle River. Facilities on Grand Forks AFB discharge sanitary wastewater to sewage treatment lagoons to the east of the main installation. The sewage treatment lagoons, classified as lakes according to the National Wetlands Inventory (NWI), are approximately 320 acres and discharge into Kellys Slough to the east (GFAFB 2009b).

**Floodplains.** The Red River Basin is subject to frequent floods that affect urban and rural infrastructure and agricultural production (USACE 2011). Turtle River is the only river to cross the Grand Forks AFB

boundary; therefore, a portion of the 100-year floodplain for the Turtle River is present in the northwesternmost corner of the installation. Flooding is estimated to occur along Turtle River every 0.8 to 1.5 years (RRRC 2006). According to the FEMA FIRM Panel No. 38035C0525E (effective 17 December 2010), the 100-year floodplain associated with Turtle River extends along the northwestern panhandle of the installation boundary, adjacent to 22nd Avenue (see **Figure 3-2**) (FEMA 2010). This area is classified as Zone A, indicating it is within the 100-year floodplain. Areas within the floodplain are required to comply with National Flood Insurance Program floodplain management requirements, such as constructing buildings above base flood level and obtaining flood insurance coverage. There are also 100-year floodplains along the southeastern boundary of the sewage treatment lagoons associated with Kellys Slough.

**Wetland Hydrology.** Wetlands at Grand Forks AFB are classified as prairie potholes, meaning that they were formed from glacial activity. Prairie potholes are also called sloughs, and maintain wetland hydrology through inflow from surface water runoff, direct precipitation, and groundwater inflow entering the wetland (Stewart and Kantrud 1972). Prairie potholes experience extreme yearly and seasonal fluctuations in water depth. Variations in water depth often result in corresponding changes in salinity, with decreased salinity occurring when more water is present for dilution. Spring runoff from snowmelt provides a major source of water (GFAFB 2010b). Most outflows occur through seepage, and are attributable to the wetland depressions occurring in permeable glacial till. The presence of surface water is a controlling factor of the establishment and maintenance of marsh and aquatic vegetation and habitat (Stewart and Kantrud 1972). Wetland habitat and biota are discussed in **Section 3.5.2**.

## Off-Installation Properties

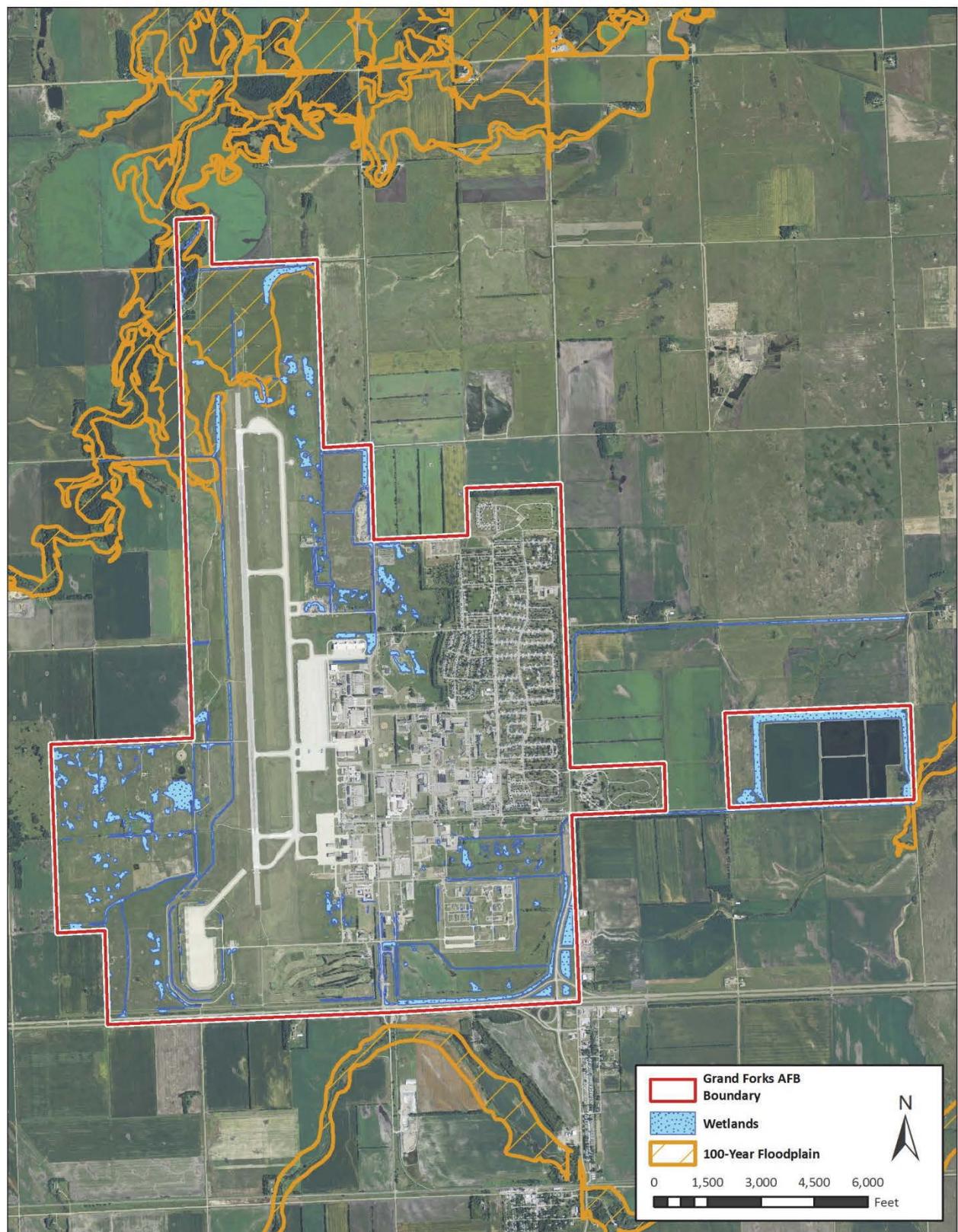
Off-installation properties considered in this EA include Mekinock Prairie Chicken WMA, North Dakota Game and Fish WMA, Crawford Oakville Prairie WMA, and Turtle River State Park. Kellys Slough NWR is in the vicinity of Grand Forks AFB, but it would be excluded from the mosquito control. **Figure 3-3** provides the location of the off-installation properties and the water resources associated with them.

**Groundwater.** For all off-installation properties, groundwater would be similar to that described for Grand Forks AFB, with the Dakota Group aquifer as the principal groundwater aquifer.

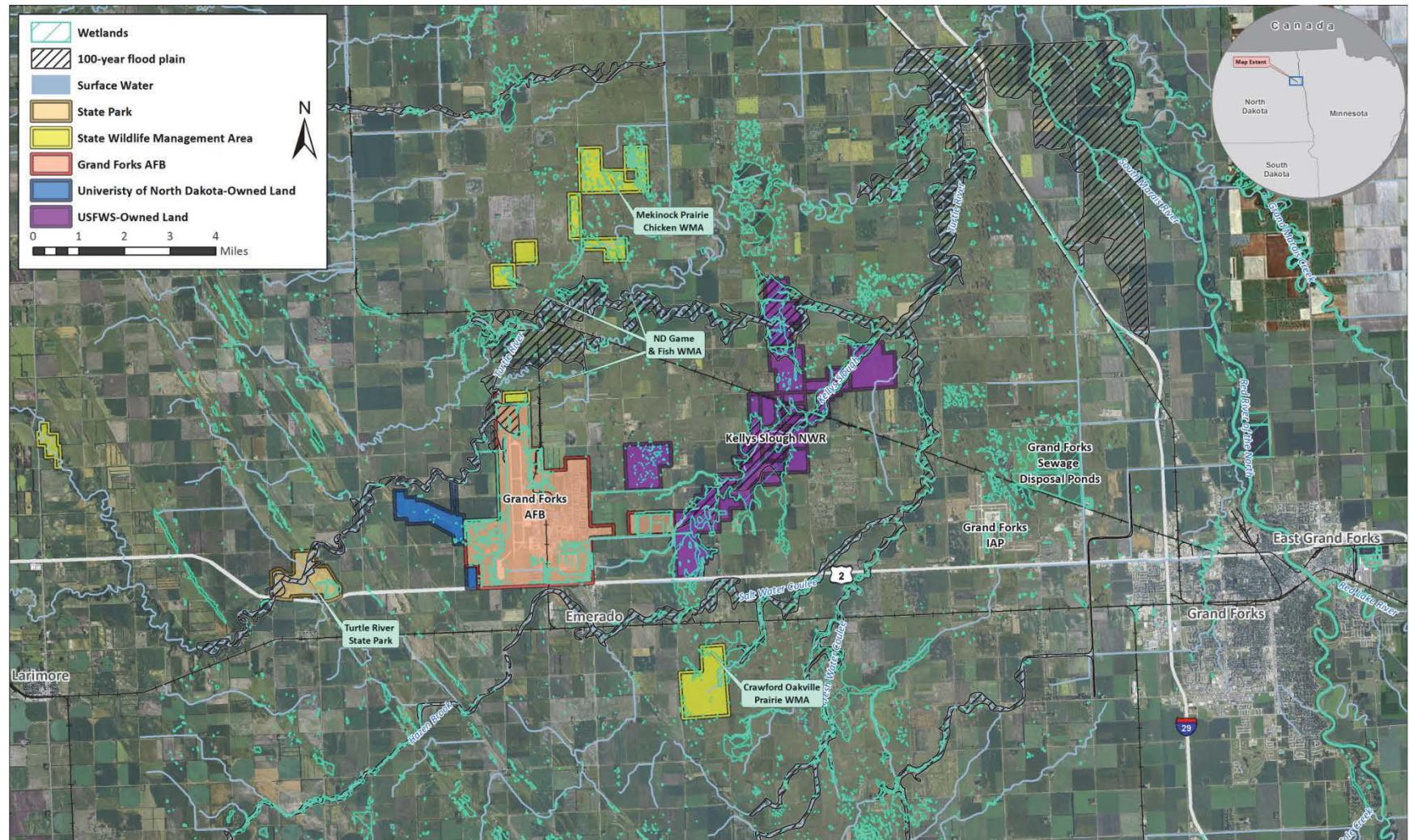
**Surface Water.** All off-installation properties are in the Red River Basin. The Turtle River flows south of the Mekinock Prairie Chicken Preserve and adjacent North Dakota Game and Fish WMA, to the west of the North Dakota Game and Fish WMA adjacent to Grand Forks AFB, and through the Turtle River State Park.

**Floodplains.** The off-installation properties mapped within the 100-year floodplain are the Turtle River State Park and Kellys Slough NWR. The floodplain within the Turtle River State Park is mapped from the northeastern corner, through the center of the park, and exits the park in the southwestern corner. The floodplain mapped in Kellys Slough NWR is in two locations, following the channels of Kellys Slough from the northeastern corner to the southwestern corner and the Turtle River in the northern portion of the NWR. Most of Kellys Slough NWR is contained within the mapped 100-year floodplain.

**Wetland Hydrology.** Wetland hydrology for all off-installation properties would be similar to that described for Grand Forks AFB.



**Figure 3-2. Water Resources at Grand Forks AFB**



**Figure 3-3. Water Resources for Off-Installation Sites**

### 3.4.3 Environmental Consequences

#### Evaluation Criteria

Evaluation criteria for effects on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action could have a significant effect with respect to water resources if any the following were to occur:

- Substantially reduce water availability or supply to existing users
- Overdraft groundwater basins
- Exceed safe annual yield of water supply sources
- Substantially affect water quality adversely
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources.

The potential effect of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

### 3.4.4 Proposed Action

#### Grand Forks AFB

Under the Proposed Action, pesticide application rates would be followed based on the pesticide labels (see **Table 2-1** and **Appendix B**) and a current DoD Pesticide Applicator Certification or state pesticide certification would be required for all personnel applying pesticides. Application of all aerial pesticides would be consistent with Air Force Instruction (AFI) 32-1074, *Aerial Application of Pesticides*. A PGP would be obtained for pesticide application within Turtle River, which is a jurisdictional water of the United States. If an accidental spill were to occur on the installation, the applicator would collect the material and dispose of it in accordance with manufacturer's specifications and the SPCC Plan.

#### Larval Mosquito Chemical Control

The impacts on water resources from the application of the three products most likely to be used for larval mosquito control, including Altosid® liquid larvicide, Altosid® XR briquettes, and Vectobac® granules are discussed in the following paragraphs.

**Altosid® Liquid Larvicide and Altosid® XR Briquettes.** No effects on groundwater would be expected from the use of Altosid® in either liquid or briquette form. The active ingredient in Altosid® liquid larvicide and briquettes is Methoprene. Grand Forks AFB has applied Altosid® to the installation and surrounding areas via aerial applications, and Altosid® for mosquito control can be used in water that is consumed by humans. Methoprene is not persistent in soils and is unlikely to contaminate groundwater. Methoprene is not likely to leach into groundwater because it rapidly adsorbs to soil particles and, therefore, it is unlikely to percolate deeper into soil layers to penetrate into groundwater. Short-term, negligible impacts on water resources would be expected from the use of Altosid®, as methoprene degrades rapidly in water by microorganisms (Cornell University 1995). A PGP would be required for applications within the Turtle River.

**Vectobac® Granules.** No effects on water resources would be expected from the application of Vectobac® granules. *Bti* is the active ingredient in Vectobac® granules and is stable in water for 24 to 48

hours. This product is safe enough to be used in water that is consumed by humans. Label instructions would be strictly adhered to for the application of this product.

### **Ground Application of Adult Mosquito Chemical Control**

The impacts on water resources from the three products most likely to be used for adult mosquito control, including Mavrik®, Anvil®, Kontrol 4-4, and Duet™, would be short- to long-term, negligible to minor, and adverse. Effects for each pesticide are discussed in the following paragraphs.

**Mavrik®.** Use of Mavrik® as a barrier spray would result in short- to long-term, negligible to minor, adverse effects on water resources due to potential groundwater leaching. Fluvalinate is nearly insoluble in water, and, therefore, is unlikely to contaminate groundwater. However, leaching of fluvalinate metabolites could occur. Exposure to sunlight causes fluvalinate to degrade and typically has a half-life of up to 1 day when in the water column. Microbes also degrade fluvalinate, and it is strongly adsorbed to soil particles (Cornell University 1996).

**Anvil® Kontrol 4-4, and Duet™.** Minimal risks to human health and the environment are anticipated when Anvil® is used according to label directions (CMMCP undated). Pyrethroids break down quickly in sunlight and readily bind to soils and, therefore, are not expected to contaminate groundwater (NYCHMH 2012). Anvil® is additionally broken down by microbes in surface waters exposed to sunlight. Pyrethroids are toxic to bees, fish, and other aquatic life forms and would not be applied to bodies of water (MOHHS 2010).

**Trumpet Liquid Adulticide.** The active ingredient in Trumpet Liquid Adulticide is naled. Short-term, negligible impacts on groundwater would be expected from naled. Naled is adsorbed weakly by soil particles, and is not persistent in soil as it is broken down by microorganisms. Although naled is nearly insoluble in water, it is rapidly broken down if wet and it is moderately volatile (Cornell University 1995).

In the proposed concentration for use at Grand Forks AFB and the surrounding area, naled would have no impact on the surface water, floodplains, or wetland hydrology of the treated areas. Hydrolysis of the compound is initiated immediately upon contact with moisture, and the breakdown is proportional to the temperature and pH of the water. That is, at 25 °C (approximately 78 °F), the half-life of naled in water with a pH of 7 is about 15 hours. Naled half-life in soil is less than 8 hours and is undetectable after 1 day under either aerobic or anaerobic conditions. Under normal circumstances, most of the applied naled (and its major decomposition products) would be degraded within 24 hours of application. The material is applied by ULV at a rate less than 1 ounce per acre, thereby eliminating the possibility of runoff onto non-target areas due to application procedures. Limited data indicate that the rapid dissipation and relatively low mobility of naled and intermediate mobility of dichlorvos (a degradate of naled) in soil would mitigate contamination of groundwater (GFAFB 2003e). Label instructions would be strictly adhered for the application of this product.

### **Adult Mosquito Physical and Biological Controls**

Biological control agents, including native or introduced predators, are often used in combination with water management practices to manage mosquitoes. At Grand Forks AFB, this is currently accomplished through the use of bat boxes, which provide habitat for bats. Brown bats can eat 500 to 1,000 mosquitoes per hour and are great natural pest predators (NWF 2012).

The adoption of a routine storm water drainage management program throughout Grand Forks AFB would include the regular maintenance of drainage ditches. The ditches are currently overgrown with

vegetation and are producing standing water that provides breeding locations for mosquitoes. As part of regular maintenance, the ditches would be cleared of vegetation using mechanical methods.

No impacts on groundwater would be anticipated from drainage ditch maintenance as the most surficial aquifer is confined and no groundwater would be used. Long-term, beneficial impacts on floodplains would be anticipated from regular maintenance and vegetation clearing of drainage ditches so that water flow can occur more efficiently and flooding potential would decrease. Long-term, beneficial impacts on wetland hydrology would be expected as the natural flow of water would be restored to the ditches.

Long-term, beneficial impacts on surface water would be expected due to a decrease in stagnant water and associated bacteria and parasites on the installation once drainage ditches are regularly maintained. Removal of vegetation from the ditches would result in short- and long-term, beneficial impacts on flow and water quality. Compliance with EISA Section 438, and adherence to an erosion-and-sediment-control plan (ESCP) and storm water pollution prevention plan (SWPPP), should prevent surface water degradation. Proper implementation of appropriate BMPs would be implemented to minimize the potential for adverse effects on waters of the United States.

Impacts on floodplains would be short-term, negligible, and adverse due to temporary increases in soil erosion and sedimentation during drainage ditch maintenance activities. However, BMPs would be implemented to ensure that erosion and sedimentation does not occur.

All activities would be coordinated through the USACE Omaha District in Bismarck, North Dakota. The North Dakota Office of the State Engineer handles permits for projects than involve the drainage of more than 80 acres of wetlands. Some drainage ditches could be considered wetlands by the USACE if they have not been regularly maintained to preserve drainage ditch features. General maintenance activities like mowing and raking do not require a permit or coordination.

Grand Forks AFB would be required to obtain a permit under Section 404 of the CWA for actions determined to adversely impact jurisdictional waters of the United States on the installation through ditch maintenance. If it is determined that discharge into waters of the United States from ditch maintenance would occur, Grand Forks AFB would be required to undergo Section 401 water quality certification and obtain an NPDES permit prior to conducting maintenance activities.

### **Noxious and Invasive Weed Control**

Noxious and invasive weed control is conducted using a variety of methods on Grand Forks AFB. Herbicides are one method for the control of weeds in an integrated approach. Rodeo® is used for weeds in aquatic systems. Milestone® is frequently used on the installation for the control of thistles. Weed-Be-Gone is another chemical that is frequently used in the self-help program. In general, impacts on water resources from the use of the herbicides discussed in the following paragraphs would be short-term, negligible to minor, and adverse on surface water by contaminating storm water runoff or entering waterways through drift. No impacts on groundwater would be anticipated.

**Rodeo®.** Rodeo® is an herbicide approved for use in aquatic systems, with glyphosate as the active ingredient. Rodeo® is most effective on emergent plants and kills the plant roots, resulting in weed control for several years. Use of herbicides within wetlands, ditches, or lagoons would be coordinated with the Environmental Management Office, and a PGP would be required if applications were to occur within the Turtle River.

No impacts on groundwater would be expected from the use of Rodeo®. The glyphosate in Rodeo® is strongly adsorbed onto soil particles, with low potential to move through soil to contaminate

groundwater. Microbes in the soil readily and completely degrade it even under low-temperature conditions.

The proper application of Rodeo® would have short-term, negligible, adverse impacts on surface water quality with the use of proper application practices. When released into water, glyphosate tends to adhere to sediments and is readily degraded by microbial action into natural substances such as carbon dioxide. These natural substances are not anticipated to be in large enough quantities to result in negative impacts on water quality. Once in contact with surface water, glyphosate is removed by binding to sediment and is then degraded by microbes. Glyphosate has a half-life of less than 7 days in water and no significant bioaccumulation would be expected. No impacts on floodplains or wetland hydrology would be expected from the application of Rodeo®.

**Milestone®.** The active ingredient in Milestone® is Aminopyralid. Aminopyralid is a Reduced Risk herbicide that provides reliable control of a broad spectrum of difficult-to-control noxious weeds and invasive plants on rangeland and pastures, rights-of-way, and wildlife habitat areas. Reduced-risk is an USEPA designated registration status that accelerates the process for registration of certain new plant protection products. It is usually granted to products that have low use rates and low toxicity. Aminopyralid can also provide residual weed control activity by suppressing reinfestations and reducing the need for retreatment, depending on the application rate and the target weeds (USEPA 2005).

No effects on groundwater would be expected from the use of Milestone®. Aminopyralid is weakly adsorbed to soil. Two field dissipation studies performed in California and Mississippi indicated that aminopyralid is likely to be non-persistent and relatively immobile. Half-lives of 32 and 20 days were determined, with minimal leaching below the 6- to 12-inch horizon depth (USEPA 2005).

The proper application of Milestone® would have a short-term, negligible, adverse impact on surface water quality with the use of proper application practices. In aquatic systems, the primary cause of degradation is photolysis, the decomposition of a compound by light, where a laboratory experiment yielded a half-life of 0.6 days (corrected for natural sunlight conditions) (USEPA 2005). Milestone® can enter surface water through three routes: direct application to aquatic vegetation, binding to soil that washes off treated terrestrial sites, or through drift from treated areas near water.

Through terrestrial applications of Milestone®, it is expected that a small amount of the applied herbicide might enter surface waters indirectly through storm water runoff or soil particles that wash off treated areas. When Milestone® applications occur near water, it is possible that a small percentage of sprayed material could reach the water during application. Milestone® would not be applied directly to water features. The use of buffers around surface water bodies would further reduce the possibility of movement of herbicides into water resources from storm water runoff or drift.

Milestone® application would occur only at designated areas on the installation using BMPs to lower the potential for runoff of herbicide residue into surface water bodies. If an accidental spill occurs on the installation, the applicator would collect the material and dispose of it in accordance with manufacturer's specifications and the SPCC Plan. Proper application methods, correct weather conditions, and time of the day are other important criteria to consider for reduction of surface water contamination. No impacts on floodplains or wetland hydrology would be expected from the application of Milestone®.

**Weed-B-Gone.** The active ingredient in Weed-B-Gone is 2 Methyl-4-Chlorophenoxyacetic Acid (MCPA). No effects on groundwater would be expected from the use of Weed-B-Gone. In general, MCPA is insoluble in water and exists naturally as a solid. MCPA does not hydrolyze. MCPA photodegrades very slowly when applied to soil surfaces and irradiated with natural sunlight, with a half-life of 67 days. In an aerobic soil metabolism study, MCPA degraded with a half-life of 24 days.

Under aerobic aquatic conditions, MCPA degrades with a half-life of greater than 30 days in water-sandy clay loam sediment systems (USEPA 2004).

The proper application of Weed-B-Gone would have a short-term, minor, adverse impact on surface water quality with the use of proper application practices. The Weed-B-Gone label states that this product should not be applied to water. Weed-B-Gone can enter surface water through three routes: direct application to aquatic vegetation, binding to soil that washes off treated terrestrial sites, or through drift from treated areas near water. Through terrestrial applications of Weed-B-Gone, it is expected that a small amount of the applied herbicide might enter surface waters indirectly through storm water runoff or soil particles that wash off treated fields. When Weed-B-Gone applications occur near water, it is possible that a small percentage of sprayed material could reach the water during application. The use of buffers around surface water bodies would further reduce the possibility of movement of herbicides into water resources from storm water runoff or drift.

Weed-B-Gone application would occur only at designated areas on the installation through the self-help program using BMPs to lower the potential for runoff of herbicide residue into surface water bodies. If an accidental spill occurs on the installation, the applicator would collect the material and dispose of it in accordance with manufacturer's specifications and the SPCC Plan. Application methods, weather conditions, and timing are other important criteria to consider for reduction of surface water contamination. No impacts on floodplains or wetland hydrology would be expected from the application of Weed-B-Gone.

## Off-Installation Properties

Impacts on off-installation properties for larval and adult mosquito control would be similar to those described for Grand Forks AFB for chemicals that can be applied using an aerial application, and would be short-term and negligible.

Adult mosquito physical and biological controls and noxious and invasive weed control would only occur on Grand Forks AFB; therefore, no impacts on off-installation properties would be expected.

### 3.4.5 No Action Alternative

Under the No Action Alternative, there would be no change from existing conditions at the installation, as described in **Section 3.4.2**. Negligible to minor impacts on water resources would be anticipated from the continuation of improper management of the ditches. As the amount of vegetation that is present in the ditches increases, the threat of flooding, erosion, and sedimentation increases.

## 3.5 Biological Resources

### 3.5.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the USFWS along with any species identified by the North Dakota Game and Fish Department (NDGFD) as Species of Conservation Priority and species listed by the North Dakota Natural Heritage Program (NDNHP). Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the ESA and sensitive ecological areas as designated by state or Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

This biological resources section includes a discussion on wetlands habitat, whereas wetland hydrology is discussed in **Section 3.4.1**, Water Resources.

### 3.5.2 Existing Conditions

#### Grand Forks AFB

**Vegetation.** The general vegetation cover types on Grand Forks AFB consist of mixed grasses, prairie grasses, planted trees, wet meadow vegetation, and woodland (shown in **Figure 3-4**). When the initial construction of Grand Forks AFB was completed in the mid-1950s, most of the installation was planted with a standard mixture of grasses established by the DoD, which included two introduced grass species, smooth bromegrass (*Bromus inermis*) and Kentucky blue grass (*Poa pratensis*). These two introduced grasses are still predominant throughout the installation. Large portions of the unimproved areas on Grand Forks AFB support the active cultivation of hay. In addition, 165 acres have been restored to native grasses and are used for the cultivation of hay. Trees planted in housing areas are primarily blue spruce (*Picea pungens*), green ash (*Fraxinus pennsylvanica*), and Lombardy poplar (*Populus nigra*). There are no known prairie remnants on Grand Forks AFB; however, some prairie index species, such as coneflowers (Asteraceae), are found in the unimproved and semi-improved areas mixed in with bromegrass and various herbaceous annuals such as goldenrod (*Solidago* spp.) (GFAFB 2011). Grand Forks AFB is restoring portions of prairie areas on the installation including the Prairie View Nature Preserve east of the Prairie View Court Military Family Housing (MFH) area and a 160-acre hay land area restored to native grasses around the MSA.

Grass heights within semi-improved areas, including airfield areas within 300 feet of the runway centerline, are maintained between 7 and 14 inches. Beyond the 300-foot border surrounding the runway, hay cutting dictates the height of the vegetation. Some former landfill areas have been seeded with native grasses (e.g., western wheatgrass [*Agropyron smithii*], thickspike wheatgrass [*A. dasystachum*], and slender wheatgrass [*A. trachycaulum*]) and sweet clover (*Melilotus* species) (GFAFB 2011).

One natural community, the wooded riparian corridor of the Turtle River, is represented within the installation boundaries. Dominant trees in this community are elm (*Ulmus* spp.), cottonwood (*Populus deltoids*), and green ash. However, Dutch elm disease has killed many of the elms. European buckthorn (*Rhamnus frangula*) (a highly invasive exotic species), chokecherry (*Prunus virginiana*), and wood rose (*Rosa woodsii*) are common understory species. Wood nettle (*Laportea canadensis*), stinging nettle (*Urtica dioica*), beggars-ticks (*Bidens frondosa*), and waterleaf (*Hydrophyllum virginianum*) are typical forbs (GFAFB 2011).

Turfgrass and landscaped areas dominate the cantonment area and MFH areas. Improved turfgrass areas on Grand Forks AFB are dominated by red fescue (*Festuca rubra*) and Kentucky bluegrass. Shelterbelts, composed mostly of American elm (*Ulmus Americana*), green ash, Russian olive (*Elaeagnus angustifolia*), and cottonwoods, were planted in a number of locations to help protect housing and other cantonment areas from wind, cold, and snow. The use of Russian olives at Grand Forks AFB has been eliminated due to their massive seed production and ability to rapidly overrun an area to the detriment of native species (GFAFB 2011).

**Noxious and Invasive Species.** Noxious weeds have been an increasing issue at Grand Forks AFB. Weed growth has expanded to all areas of the installation. Construction and demolition activities create disturbances that can increase the spread of noxious weeds. P.L. 93-629, *Federal Noxious Weed Act*, mandates control of noxious weeds by limiting possible weed seed transport from infested areas to noninfested sites. The spread of noxious weeds is controlled by avoiding activities in or adjacent to heavily infested areas, removing seed sources and propagules from the site prior to conducting activities,

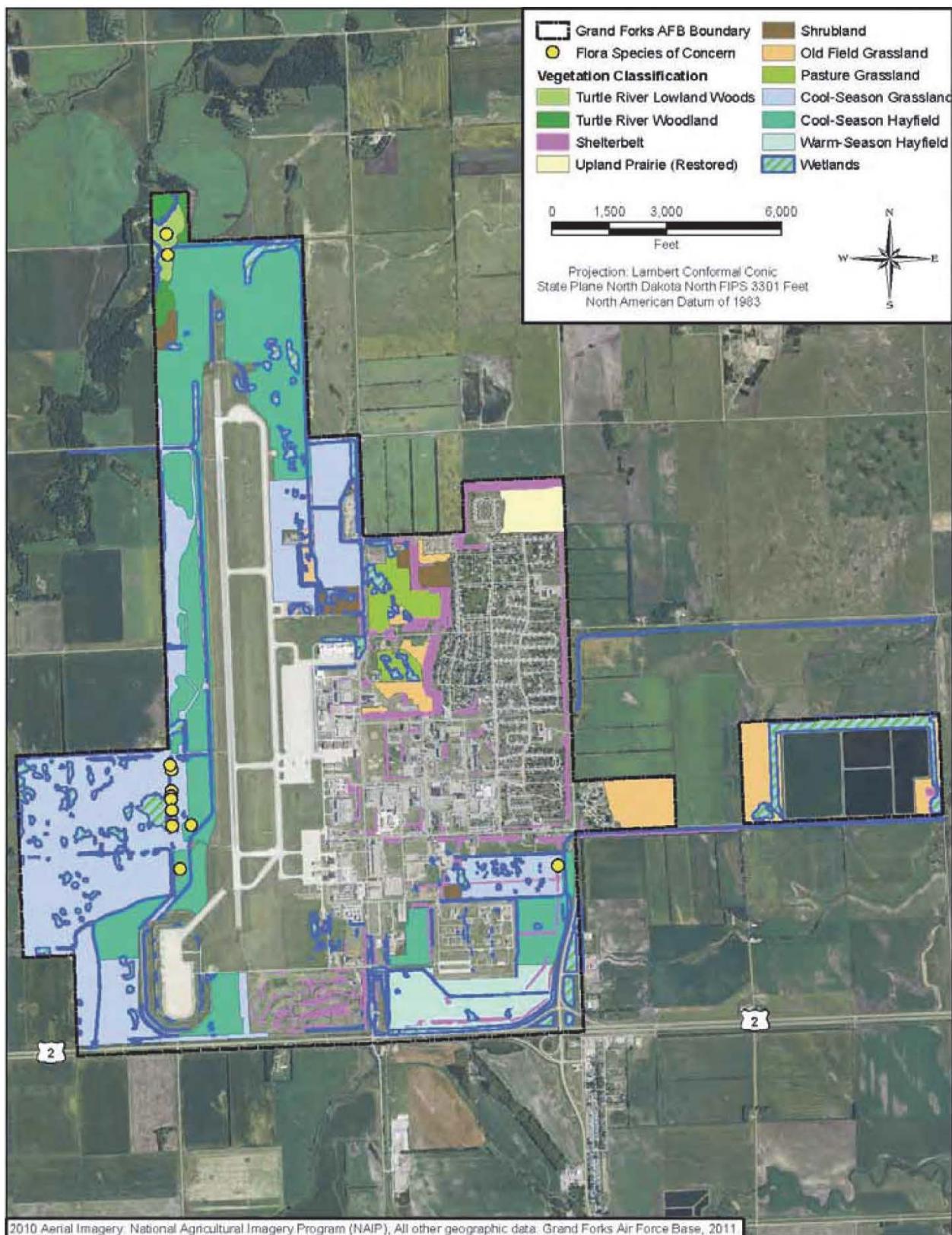


Figure 3-4. Grand Forks AFB Vegetation Distribution Map

or limiting operations to nonseed-producing seasons. Following activities that expose the soil, mitigation can be achieved by covering the area with weed-seed free mulch or seeding the area with native species. Covering the soil reduces the germination of weed seeds, maintains soil moisture, and minimizes erosion.

The current list of noxious weeds on Grand Forks AFB includes absinth wormwood (*Artemisia absinthium*), Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), field bindweed (*Convolvulus arvensis*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), spotted knapweed (*Centaurea maculosa*), and perennial sowthistle (*Sonchus arvensis*). Additional invasive species at the installation include bull thistle (*Cirsium vulgare*) and wavyleaf thistle (*Cirsium undulatum*). Invasive populations are greatest in areas that have been disturbed but are not mowed regularly. Compliance with Federal and state law requires the development of an installationwide noxious weed control and monitoring program (GFAFB 2011).

**Wildlife.** The installation supports a remarkable diversity of wildlife given its size and location within an agricultural matrix. The Turtle River riparian corridor, Prairie View Nature Preserve, grassland areas on the western side of the installation, and the lagoons to the east of the installation all provide important habitat for native plant and wildlife species (GFAFB 2004).

Common mammals on the installation include white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Silvilagus floridanus*), white-tailed jackrabbit (*Lepus townsendii*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), badger (*Taxidea taxus*), plains pocket gopher (*Geomys bursarius*), northern pocket gopher (*Thomomys talpoides*), muskrat (*Ondatra zibethica*), squirrels (*Sciurus* spp. and *Spermophilus* spp.), meadow vole (*Microtus pennsylvanicus*), shrews (*Sorex* spp.), white footed mouse (*Peromyscus leucopus*), deer mouse (*P. maniculatus*), meadow jumping mouse (*Zapus hudsonius*), silver-haired bat (*Lasionycteris noctivagans*), and red bat (*Lasiurus borealis*) (GFAFB 2011, GFAFB 2004). An active beaver dam was observed along Turtle River during the fall 2009 biological survey (GFAFB 2010b).

A total of 218 bird species have been recorded at Grand Forks AFB (GFAFB 2004). Common bird species include brown-headed cowbird (*Molothrus ater*), clay-colored sparrow (*Spizella pallida*), western meadowlark (*Sturnella neglecta*), American goldfinch (*Spinus tristis*), red-winged blackbird (*Agelaius phoeniceus*), mourning dove (*Zenaida macroura*), cliff swallow (*Petrochelidon pyrrhonota*), and common grackle (*Quiscalus quiscula*) (USAF 2008).

Migration and breeding bird surveys conducted in 2007 determined that the habitat types with the most bird species observed during the migration period (May) included the lagoons east of the main installation (46 species), shallow marsh (33 species), open field (32 species), and riparian woodland (31 species). The habitat types with the most bird species observed during the breeding season (June) included the lagoons east of the main installation (41 species), open field (35 species), and the shallow marsh (35 species) (USAF 2008).

Common reptiles and amphibians occurring on Grand Forks AFB include the western painted turtle (*Chrysemys picta bellii*), common garter snake (*Thamnophis sirtalis*), tiger salamander (*Ambystoma tigrinum*), and wood frog (*Rana sylvatica*) (GFAFB 2010a).

Minnows and carp have been identified on Grand Forks AFB (GFAFB 2011, GFAFB 2007c). In addition, some game fish species occur in portions of the Turtle River, which crosses the northernmost portion of Grand Forks AFB, including northern pike (*Esox lucius*), white sucker (*Catostomus commersonii*), rock bass (*Ambloplites rupestris*), black bullhead (*Ameiurus melas*), and channel catfish (*Ictalurus punctatus*). The State of North Dakota stocks the Turtle River upstream of Grand Forks AFB with brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) each spring near Turtle River State Park (GFAFB 2011). There are also a multitude of terrestrial and aquatic invertebrates and crustacean that can be found on the installation.

**Protected and Sensitive Species.** No federally listed threatened or endangered species are known to occur on Grand Forks AFB (GFAFB 2010b). There is no critical or significant habitat present on Grand Forks AFB. Species listed by the U.S. Fish and Wildlife Service (USFWS) as having the potential to reside in the vicinity include the gray wolf (*Canis lupus*) and whooping crane (*Grus americana*). The gray wolf, federally listed as endangered, is infrequently observed in North Dakota and no records of its presence on Grand Forks AFB exists (GFAFB 2006). If gray wolves did occur on Grand Forks AFB, they would most likely occur in the northwesternmost portion of the installation in the Turtle River wooded riparian corridor. Any wolves occurring in the Turtle River corridor would likely be transient since the habitat does not appear to be large enough to support a breeding population (USFWS 2010). The whooping crane, federally listed as endangered, could use the wetlands in the vicinity of Grand Forks AFB as stopover feeding habitat during migration. Stopover feeding habitats of whooping cranes often include wetlands that are less than 6 acres in size (Austin and Richert 2001), which do occur on the installation. Whooping cranes would not use Grand Forks AFB as migration stopover roosting habitat, as they only use large wetlands (e.g., 100 acres or greater of contiguous wetlands) for this purpose (Austin and Richert 2001). The primary migration route of whooping cranes is through the center and northwestern portions of North Dakota, rather than the eastern portion of North Dakota where Grand Forks AFB occurs (Austin and Richert 2001). However, whooping cranes have been observed on various roosting and feeding areas throughout the migration path, which extends through North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Sitings of whooping cranes during fall migration have also been made in Minnesota, east of Grand Forks AFB (Austin and Richert 2001). Additionally, the Western prairie fringed orchid (*Platanthera praecox*), federally listed as threatened, and the Dakota skipper (*Hesperia dacotae*), a federal candidate species, are present in Polk County, Minnesota, and may be present in East Grand Forks, MN (USFWS 2012).

The North Dakota Natural Heritage Program compiled the State Threatened and Endangered List. Five major criteria are considered in evaluating a species: (1) occurrence, (2) vulnerability, (3) type(s) of threat, (4) degree of protection, and (5) taxonomy. A species is considered critically endangered if it received a state rank of S1 (critically imperiled), endangered if it received a state rank of S2 (imperiled), or threatened if it received a state rank of S3 (vulnerable).

Two avian species found on the installation during the 2007 field season are considered to be state-listed as endangered. These include the bald eagle (*Haliaeetus leucocephalus*) with a state rank of S1 (critically imperiled) and the merlin (*Falco columbarius*) with a state rank of S2 (imperiled).

The northern leopard frog (*Rana pipiens*), a state-ranked S1 (critically imperiled) species, was documented within the project area during the spring 2009 survey (GFAFB 2010b). The western United States population of the northern leopard frog is currently under review by the USFWS for listing as a federally threatened species (USFWS 2009, GFAFB 2010b). Northern leopard frogs use wetlands and shallow ponds as breeding and tadpole habitat (Smith and Keinath 2007). Following reproduction, adult northern leopard frogs move into upland habitats (primarily meadows and grasslands) in which they might feed for the summer (Smith and Keinath 2007). The northern leopard frog is one of the more terrestrial of the frogs in the Ranidae family, using a considerable amount of upland habitat around breeding ponds (Smith and Keinath 2007). In the fall, subadult and adult frogs migrate to overwintering sites. Leopard frogs likely overwinter in the bottoms of flowing streams, such as the Turtle River, and ponds that are large enough that they do not freeze solid in winter (Smith and Keinath 2007). Streams are important migration and dispersal corridors for adult and young frogs (Smith and Keinath 2007). Leopard frogs were observed within the riparian forest along the northern border of the installation during an October 2010 biological resources reconnaissance survey (HDR 2010). These frogs were potentially migrating through the riparian forest to the Turtle River to overwinter.

Seven species found on the installation during the 2007 field season have a state rank of S3 (vulnerable) and are considered threatened in North Dakota. These include the chestnut-sided warbler (*Dendroica pensylvanica*), common goldeneye (*Bucephala clangula*), green heron (*Butorides virescens*), hooded merganser (*Lophodytes cucullatus*), Philadelphia vireo (*Vireo philadelphicus*), swamp sparrow (*Melospiza georgiana*), and white-throated sparrow (*Zonotrichia albicollis*) (USAF 2008). The bald eagle, common goldeneye, green heron, and hooded merganser were detected near the open-water lagoons to the east of the main installation. The Philadelphia vireo was using a shelterbelt on the installation. The chestnut-sided warbler and the white-throated sparrow were observed in the riparian woodland, and the swamp sparrow was observed in a shallow marsh. A merlin was observed in a neighborhood. Several merlin nests have been observed in previous years at Grand Forks AFB and the surrounding area (USAF 2008).

The North Dakota Game and Fish Department has identified 100 species as Species of Conservation Priority as part of its *Comprehensive Wildlife Conservation Strategy* (Hagen et al. 2005). There are 22 bird species and 2 mammal species that have been observed on Grand Forks AFB that are included in North Dakota's 100 Species of Conservation Priority (see **Table 3-4**). Level I species are those having a high level of conservation priority because of declining status in North Dakota or across their range; or have a high rate of occurrence in North Dakota, constituting the core of the species breeding range, but might be at risk rangewide. Level II species are those having a moderate level of conservation priority. Level III species are those having a moderate level of conservation priority but are believed to be peripheral or non-breeding in North Dakota. Eleven conservation priority species on Grand Forks AFB are classified as Level I species, 12 species are classified as Level II, and 1 species is classified as Level III.

Migratory birds are protected under the Migratory Bird Treaty Act of 1918 and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. The vast majority of birds occurring on Grand Forks AFB are migratory birds. Eighty-six species of neotropical migratory birds have been observed on the installation. Neotropical migratory birds are those species that spend approximately 8 months of the year wintering in Central and South America and the remaining months on their breeding grounds in North America's temperate latitudes. Numerous neotropical migrant species use the various habitats on the installation, either as a migratory stopover habitat or for breeding (USAF 2008).

Although bald eagles were recently delisted from the ESA, they are still protected under the Bald and Golden Eagle Protection Act of 1984. Bald eagles are also listed by the NDNHP as S1-Critically imperiled and as endangered by the North Dakota Chapter of the Wildlife Society. The bald eagle is also classified as having a moderate level of conservation priority (Level II) by the NDGFD in its 100 species of conservation priority. Bald eagles migrate throughout North Dakota during the spring and fall, but generally follow the major river systems of the state. Bald eagles observed at Grand Forks AFB have been documented harassing waterfowl near the sewage lagoons, occasionally seen feeding on road kill in the area, and observed hunting in the Turtle River riparian area. The closest documented bald eagle nest to Grand Forks AFB is approximately 2 miles east of the installation on the west side of Kellys Slough NWR, which may be within the spray drift zone. Golden eagles (*Aquila chrysaetos*), also protected under the Bald and Golden Eagle Protection Act and listed as a Level II species of conservation priority by NDGFD, were also observed migrating through the area near the lagoons during the spring months of 2009 and 2010 (GFAFB 2011, NDGFD 2004).

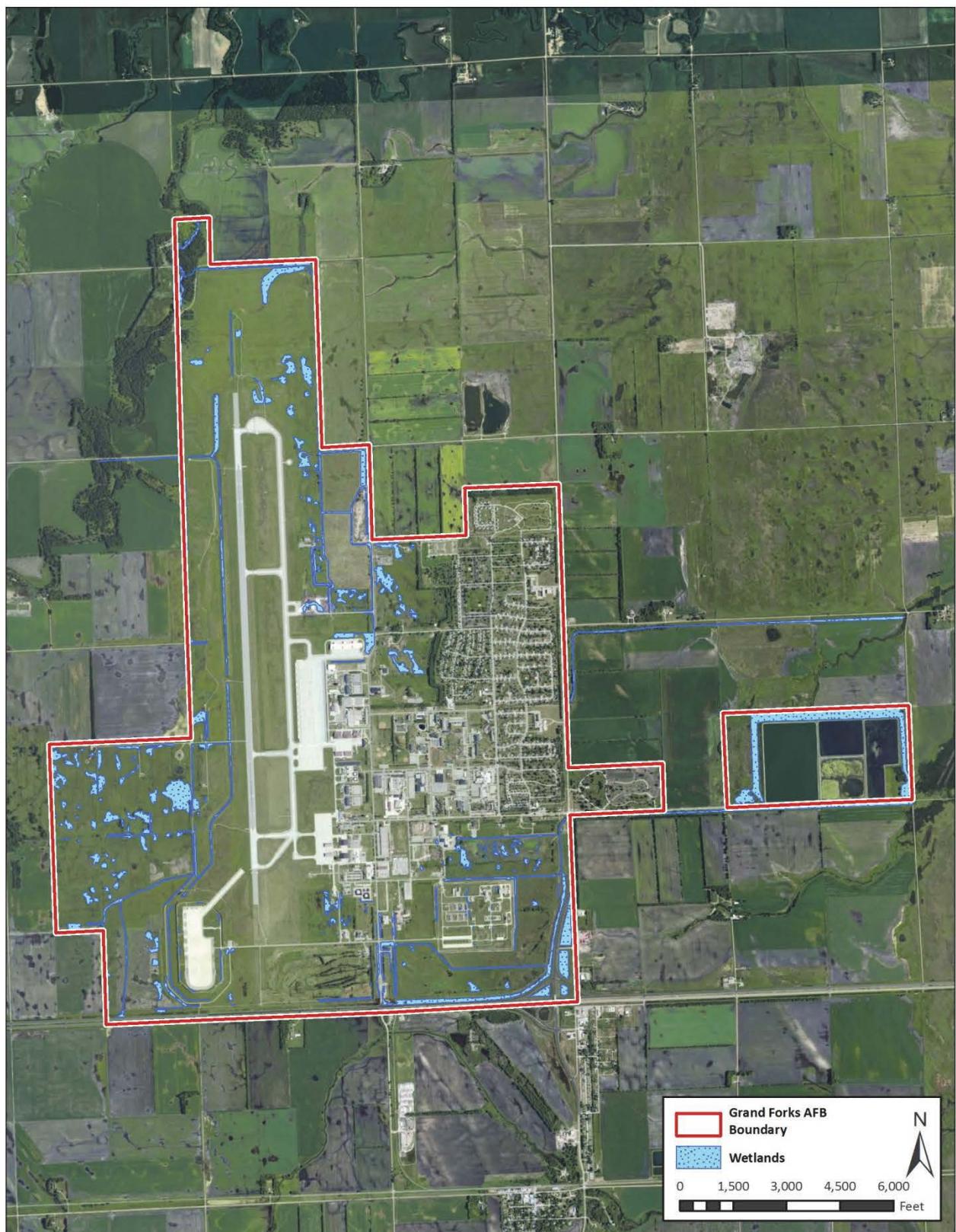
**Table 3-4. Species of Conservation Priority Observed on Grand Forks AFB**

Common Name	Scientific Name	Level I, II, or III
<b>Birds</b>		
Baird's sparrow	<i>Ammodramus bairdii</i>	I
Black tern	<i>Chlidonias niger</i>	I
Chestnut-collared longspur	<i>Calcarius ornatus</i>	I
Ferruginous hawk	<i>Buteo regalis</i>	I
Franklin's gull	<i>Larus pipixcan</i>	I
Grasshopper sparrow	<i>Ammodramus savannarum</i>	I
Horned grebe	<i>Podiceps auritus</i>	I
Swainson's hawk	<i>Buteo swainsoni</i>	I
Upland sandpiper	<i>Bartramia longicauda</i>	I
Willet	<i>Catoptrophorus semipalmatus</i>	I
Wilson's phalarope	<i>Phalaropus tricolor</i>	I
American avocet	<i>Recurvirostra americana</i>	II
Bald eagle	<i>Haliaeetus leucocephalus</i>	II
Bobolink	<i>Dolichonyx oryzivorus</i>	II
Canvasback	<i>Aythya valisineria</i>	II
Le Conte's sparrow	<i>Ammodramus lecontei</i>	II
Loggerhead shrike	<i>Lanius ludovicianus</i>	II
Northern harrier	<i>Circus cyaneus</i>	II
Northern pintail	<i>Anas acuta</i>	II
Redhead	<i>Aythya americana</i>	II
Sedge wren	<i>Cistothorus platensis</i>	II
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	II
<b>Amphibians</b>		
Canada (Dakota) toad	<i>Bufo hemiophrys</i>	I
<b>Mammals</b>		
Richardson's ground squirrel	<i>Spermophilus richardsonii</i>	II
Arctic shrew	<i>Sorex arcticus</i>	III

Source: Hagen et al. 2005

There are four state-ranked plants on the installation: the lesser yellow lady's slipper (*Cypripedium parviflorum* var. *parviflorum*), white lady's slipper (*Cypripedium candidum*), eastern prickly gooseberry (*Ribes cynosbati*), and Dutchman's breeches (*Dicentra cucullaria*). The lesser yellow lady's slipper and white lady's slipper are state-listed as imperiled or vulnerable, respectively, and are present along the flightline fence in the southwestern portion of the installation. The eastern prickly gooseberry (state vulnerable) and Dutchman's breeches (state critically impaired) exist in the northwestern part of the installation, where Turtle Creek is present (GFAFB 2010b). No federally threatened or endangered plant species have been identified on Grand Forks AFB.

**Wetland Habitat.** The Red River Basin contains thousands of natural wetlands and prairie potholes. These wetlands have a profound effect on the hydrologic flow regime of streams and the residence time of water within the basin. These wetland areas generally occur in areas of poorly drained soils in shallow depressions formed on glacial and lacustrine plains. Wetlands on Grand Forks AFB occur frequently in drainageways, low-lying depressions, and potholes (see **Figures 3-2** and **3-5**).



**Figure 3-5. Wetlands Mapped on Grand Forks AFB**

The current total acreages of wetlands that were calculated using geographic information system (GIS) data indicate that Grand Forks AFB has 284 wetlands composing 308 acres. Jurisdictional determinations from the USACE expire after 5 years. Most of the installation's jurisdictional determinations are beyond the 5-year lifespan and have expired. It is likely that those wetlands with expired jurisdictional determinations would be determined jurisdictional by the USACE if surveyed again. There are 30 wetlands with current jurisdictional determinations composing approximately 23 acres.

Of the installation's wetlands inventory, palustrine wetlands predominate at 305 acres (99 percent of the inventory). Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, emergents, mosses, or lichen. In addition to the 308-acre inventory, there is a 47-acre palustrine emergent/lacustrine wetland north of the installation sewage lagoons. Lacustrine wetlands are situated in a topographic depression or a dammed river channel and lacks trees, shrubs, persistent emergents, emergent mosses, or lichen.

The remaining 3 acres consist of riverine wetland present in the northwestern corner of the installation along the Turtle River. Riverine wetlands are those that occur within the river channel and are dominated by emergent vegetation. When inundated, riverine wetlands provide habitat for water-tolerant plants such as willows, and aquatic animals such as tadpoles and immature fish.

Drainageways and low-lying depressions on Grand Forks AFB have limited and localized wetland habitat. Species most commonly associated with these wetland areas are hairyfruit sedge (*Carex trichocarpa*), needle spike-rush (*Eleocharis acicularis*), flat-stem spike-rush (*E. compressa*), pale spike-rush (*E. palustris*), Baltic rush (*Juncus balticus*), grass-leaf rush (*J. marginatus*), knotted rush (*J. nodosus*), poverty rush (*J. tenuis*), Torrey's rush (*J. torreyi*), and chairmaker's bulrush (*Scirpus americanus*). Noxious weeds, such as Canada thistle, phragmites, perennial sow thistle, and wavyleaf thistle, invade the edges of wetlands on Grand Forks AFB (GFAFB 2011).

## Off-Installation Properties

### Mekinock Prairie Chicken WMA

**Vegetation.** According to the North Dakota Comprehensive Wildlife Conservation Strategy, predominant natural vegetation in this area can include grasses such as big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), prairie dropseed (*Sporobolus heterolepis*), slender wheatgrass (*Elymus trachycaulus*), mat muhly (*Muhlenbergia richardsonis*), fescue sedge (*Carex festucacea*), and meadow sedge (*Carex granularis*) (Hagen et al. 2005).

Forbs can include meadow anemone (*Anemone canadensis*), prairie cinquefoil (*Potentilla arguta*), wild licorice (*Glycyrrhiza lepidota*), prairie blazing star (*Liatris pycnostachya*), tall goldenrod (*Solidago canadensis*), black-eyed susan (*Rudbeckia fulgida*), and white sage (*Salvia apiana*) (Hagen et al. 2005). Invasive and noxious species would be similar to that described for Grand Forks AFB.

**Wildlife.** The purpose of the WMA is for the reestablishment of prairie chickens in the area (GFAFB 2011). Species of birds that can be found in this area include the sharp-tailed grouse (*Tympanuchus phasianellus*), mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), ring-necked pheasant (*Phasianus colchicus*), killdeer (*Charadrius vociferous*), eastern kingbird (*Tyrannus tyrannus*), western kingbird (*Tyrannus verticalis*), common yellowthroat (*Geothlypis trichas*), clay-colored sparrow, vesper sparrow (*Pooecetes gramineus*), savannah sparrow (*Passerculus sandwichensis*), and western meadowlark (Hagen et al. 2005).

Species of mammals can include the northern short-tailed shrew (*Blarina brevicauda*), white-tailed jackrabbit (*Lepus townsendii*), snowshoe hare (*Lepus americanus*), Franklin's ground squirrel (*Spermophilus franklinii*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), northern pocket gopher, plains pocket gopher, deer mouse (*Peromyscus maniculatus*), northern grasshopper mouse (*Onychomys leucogaster*), prairie vole (*Microtus ochrogaster*), meadow jumping mouse, coyote, red fox, raccoon, badger, striped skunk, white-tailed deer, and moose (*Alces alces*) (Hagen et al. 2005).

Species of reptiles and amphibians can include the American toad (*Bufo americanus*), Great Plains toad (*Bufo cognatus*), northern leopard frog, tiger salamander, plains garter snake (*Thamnophis radix*), and common garter snake (Hagen et al. 2005).

There are also a multitude of terrestrial and aquatic invertebrates and crustacean that can be found on this site.

**Protected and Sensitive Species.** Since this WMA is in Grand Forks County, federally threatened and endangered, state-listed, and species of conservation priority would be similar to those described for Grand Forks AFB.

**Wetland Habitat.** **Figure 3-5** provides a map of the wetlands on the Mekinock Prairie Chicken WMA. The NWI database estimates 726.7 acres of wetlands occur on this site.

### North Dakota Game and Fish WMA

Vegetation, wildlife, protected and sensitive species, and wetland habitat would be similar to that described for the Mekinock Prairie Chicken WMA. The NWI database estimates 40.3 acres of wetlands occur on this site.

### Crawford Oakville Prairie WMA

Vegetation, wildlife, protected and sensitive species, and wetland habitat would be similar to that described for the Mekinock Prairie Chicken WMA. Additionally, the Sprague's pipit (*Anthus spragueii*), a federal candidate species, was identified in the Crawford Oakville Prairie WMA in July of 2012 (Lambeth 2012). The NWI database estimates 154.7 acres of wetlands occur on this site.

### Turtle River State Park

**Vegetation.** Turtle River State Park is on the Turtle River and contains diverse habitats including upland hardwoods, wetlands, and prairie remnants. Much of the area is wooded with mixed hardwood stands, timbered hills, and lush river bottoms. Woody species that can be found here include American elm, green ash, cottonwood, choke cherry (*Prunus virginiana*), and boxelder (*Acer negundo*) (NDPRD undated). Other vegetation found in the park would be similar to that described for the Mekinock Prairie Chicken WMA.

**Wildlife.** The wooded areas of the park are full of small mammals including squirrels, woodchucks (*Marmota monax*), skunks, weasels (*Mustela* spp.), beaver, and raccoon. Larger mammals found in the park can include deer and moose. American bitterns (*Botaurus lentiginosus*), black terns, and great blue herons (*Ardea herodias*) are common along the river. In spring and autumn, thousands of migratory waterfowl pass over and through the park (NDPRD undated).

Game fish species that occur in portions of the Turtle River include northern pike, white sucker, rock bass, black bullhead, brown trout, rainbow trout, and channel catfish (GFAFB 2011).

Additional wildlife in the park would be similar to that described for the Mekinock Prairie Chicken WMA.

**Protected and Sensitive Species.** Since this park is in Grand Forks County, federally threatened and endangered, state-listed, and species of conservation priority would be similar to those described for Grand Forks AFB.

**Wetland Habitat.** **Figure 3-5** provides a map of the wetlands located on the Turtle River State Park. The NWI database estimates 72.3 acres of wetlands occur on this site.

### Kellys Slough NWR

Vegetation, wildlife, protected and sensitive species, and wetland habitat would be similar to that described for the Mekinock Prairie Chicken WMA. Additionally, the nearest Bald eagle nest site to Grand Forks AFB is on the west side of Kellys Slough NWR (GFAFB 2011).

### East Grand Forks, Minnesota

Vegetation, wildlife, protected and sensitive species, and wetland habitat would be similar to that described for the Mekinock Prairie Chicken WMA. Additionally, Sprague's pipit, the Dakota skipper, and the Western prairie fringed orchid are known to be present in Polk County and may be found within East Grand Forks.

### Larimore, Emerado, the City of Grand Forks

Vegetation, wildlife, protected and sensitive species, and wetland habitat would be similar to that described for the Mekinock Prairie Chicken WMA.

## 3.5.3 Environmental Consequences

### Evaluation Criteria

The significance of effects on biological resources is based on the following:

- The importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- The proportion of the resource that would be affected relative to its occurrence in the region
- The sensitivity of the resource to proposed activities
- The duration of ecological ramifications
- The “taking” of threatened or endangered species
- Jeopardizing threatened or endangered species or their habitat.

Effects on biological resources would be significant if species or habitats of high concern are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause reductions in population size or distribution of a species of high concern.

Ground disturbance and noise associated with construction can directly or indirectly cause adverse effects on biological resources. Direct effects from ground disturbance are evaluated by identifying the types and locations of potential ground-disturbing activities in correlation to important biological resources. Habitat removal and damage or degradation of habitats might be adverse effects associated with ground-disturbing activities.

### 3.5.4 Proposed Action

#### Grand Forks AFB

Pesticide application rates would be followed based on the pesticide labels (see **Table 2-1** and **Appendix B**), and a current DoD Pesticide Applicator Certification or state pesticide certification would be required for all personnel applying pesticides. Application of all aerial pesticides would be consistent with AFI 32-1074, *Aerial Application of Pesticides*. If an accidental spill occurs on the installation, the applicator would collect the material and dispose of it in accordance with manufacturer's specifications and the SPCC Plan.

No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected from the Proposed Action. The USFWS has identified the gray wolf and the whooping crane as having the potential of occurring within the installation. No impacts on gray wolves or whooping cranes are anticipated from the Proposed Action. Any wolves that might occur on the installation would be transient and the Proposed Action would not remove any potential wolf habitat and would only cause temporary noise disturbance. It is highly unlikely that the wolf would be in the area during the application of the products listed in **Table 2-1**. The wolf typically hunts animals such as moose, deer, and beaver; therefore, the use of pesticides should not have an impact on wolf food supply. No impact on the whooping crane would be anticipated as there is no suitable stopover feeding or roosting habitat for the whooping crane within the installation.

A reduction in adult mosquito numbers due to treatment would have a negligible impact on migratory bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon.

#### Larval Mosquito Chemical Control

##### Altosid® Liquid Larvicide and Altosid® XR Briquettes

**Vegetation.** Methoprene is biodegradable and nonpersistent, even in plants treated at very high rates (Cornell University 1995). At the proposed rate of application, no evidence exists that suggests that Altosid® would harm vegetation, and no phytotoxic activity would be anticipated (GFAFB 2003e). Therefore, no impacts on vegetation would be expected from the use of Altosid®.

**Wildlife.** Altosid® is considered an insect-growth regulator, which acts by inducing morphological changes that interfere with normal development. The result is the failure of the adult to emerge from the pupae stage. Altosid® is considered an exceptionally safe chemical for non-target species when a low application rate is used (GFAFB 2003e and Cornell University 1995). Therefore, short-term, direct, negligible impacts are expected to occur on non-target insects.

Short-term, direct, negligible impacts would be expected to occur on fish and amphibian species from the application of Altosid®. Altosid® can be toxic to these species if a high application rate is used. Care should be exercised in the mixing and application to ensure minimal risk to these species (GFAFB 2003e, Cornell University 1995). Long-term, minor, adverse impacts on fish that consume mosquito larvae would occur as the mosquito population dwindles as a result of the appropriate use of Altosid®.

No impacts are expected to occur on other mammals, birds, and bees from the application of Altosid®, as Altosid® poses essentially no risk to other mammals, birds, or bees. A reduction in adult mosquito numbers due to treatment would have negligible impacts on bird and bat species in the proposed treatment

area due to the type, diversity, and availability of organisms that they are known to feed upon (GFAFB 2003e).

At the recommended application rate, it would not harm pets or livestock. Altosid® can be applied to irrigated croplands and pastures without the removal of grazing livestock. Wild or cultivated bee colonies would not be affected and notification of beekeepers would not be required (GFAFB 2003e).

The aerial application of this chemical would have short-term, negligible to minor, direct, adverse impacts on wildlife due to noise disturbances as a result of low-flying aircraft. High noise events could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, minor, adverse effects. Most wildlife species in the project area would be expected to quickly recover once the maintenance activities have ceased for the day and after the project is complete.

**Sensitive and Protected Species.** No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected. A reduction in adult mosquito numbers due to treatment would have negligible impact on migratory bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon. Short-term, direct, negligible impacts could occur on the northern leopard frog from the application of Altosid®. Altosid® can be toxic to frogs if a high application rate is used. Care should be exercised in the mixing and application to ensure minimal risk to this species (GFAFB 2003e and Cornell University 1995).

**Wetland Habitat.** No impacts on wetland vegetation would be expected from the use of Altosid®. Short-term, negligible to minor, direct, adverse impacts are expected to occur on wetland fauna as a result of the application of Altosid®, as discussed in the previous *Wildlife* section.

### **Vectobac® Granules**

**Vegetation.** At the proposed rate of application, no evidence exists that suggests that *Bti* would harm vegetation, or that phytotoxic activity would occur (GFAFB 2003e). Therefore, no impacts on vegetation would be expected from the use of *Bti*.

**Wildlife.** Short-term, direct, negligible, adverse impacts on wildlife could occur as a result of the application of *Bti*. *Bti* would not significantly impact wildlife and nontarget organisms due to this product's target specificity, mode of action, low persistence, rapid biodegradability, and limited numbers of applications. Vectobac® is harmless to mammals (NYCHMH 2012b).

The persistence of *Bti* activity is usually no more than 2 days under typical mosquito abatement use conditions, so the effect on nontarget midge populations would be temporary. Some other non-culicid Diptera (true flies, midges) with aquatic life forms would likely be affected by ingestion of the *Bti* larvicide (GFAFB 2003e). A summary of safety tests on vertebrate and invertebrate non-target organisms compiled by one *Bti* manufacturer (Biochem Products) showed that, other than producing mortality in some species of flies and midges, no ill effects were detected in almost 100 different non-target invertebrates (GFAFB 2003e). A study examining the non-target effects of *Bti* on stream invertebrate communities and fish (Lacy and Merritt undated) found no significant effects. A point to consider when weighing the effects of reducing mosquito numbers in a marsh ecosystem is that competing non-target "nonpest" organisms can be expected to fill the ecological niche normally occupied by "pest" mosquito larvae and could, in some cases, benefit ecologically from intervention (GFAFB 2003e).

Based on its evaluation of *Bti*, the USEPA determined that toxicity and infectivity risks to nontarget avian, freshwater fish, freshwater aquatic invertebrates, estuarine and marine animals, arthropod

predators/parasites, honey bees, annelids, and mammalian wildlife would be minimal to nonexistent at the label use rates of the registered active ingredient (USEPA 1998).

**Sensitive and Protected Species.** Certain endangered lepidopteran (i.e., butterflies, skippers, moths) insect species could be affected by the kurstaki strain of *Bti*, but this strain differs from dipteran-specific israelensis strain and endangered lepidopteran species are not known to occur in the proposed treatment area (GFAFB 2003e).

**Wetland Habitat.** No impacts on wetland vegetation would be expected from the use of *Bti*. Short-term, negligible, direct, adverse impacts are expected to occur on minimal species of wetland fauna as a result of the application of *Bti* (e.g., midges and flies), as discussed in the previous *Wildlife* section.

### Adult Mosquito Chemical Control

#### Trumpet Liquid Adulticide (Active Ingredient Naled)

**Vegetation.** At the proposed rate of application, no evidence exists that suggests that naled would harm vegetation, and no phytotoxic activity would occur (GFAFB 2003e). Therefore, no impacts on vegetation would be expected from the use of naled.

**Wildlife.** Short-term, minor, direct, adverse impacts are expected to occur on nontarget aquatic and terrestrial insects from the application of naled. Mortality would be expected to occur in bees, wasps, flies, dragonflies, damselflies, butterflies, and moths that come into contact with naled. This would include neutral or beneficial species and pest species. Bees foraging on Grand Forks AFB property at the time of application would be killed. Bees can also come into contact with naled through pesticide drift zones, which are areas where the pesticide moves through air at the time of application or soon thereafter, to any site other than that intended for application. Factors influencing the presence and extent of drift include weather conditions, topography, the size of the area being sprayed, type of application equipment and methods, and decisions by the applicator. Bees exposed to naled in drift zones could be killed. However, negligible impacts on bees would be anticipated because application of naled would occur at dusk when bees are in the hive, and bee yards would be notified of spraying operations. Beekeepers living near the installation would be notified prior to treatment so that protective measures could be taken (GFAFB 2003e).

In general, hidden/protected terrestrial and aquatic insects would remain unharmed due to the rapid degradability and non-residual nature of naled. An added control benefit would occur from the control of non-target pest species such as biting midges, deer flies, horse flies, stable flies, black flies, and filth flies (GFAFB 2003e).

Short-term, minor, direct, adverse impacts are expected to occur on copepods (i.e., small crustaceans) and decapod crustaceans from the application of naled. Tests conducted in the 1960s suggested that naled was quite toxic to shrimp under confined conditions. In the 1980s, additional studies found that significant mortality occurred for copepods when exposed to naled. Environmental factors (e.g., high temperatures and salinities) appeared to influence the sensitivity of copepods to insecticides. It is assumed that copepod and decapod crustaceans populations would recover after treatment (GFAFB 2003e).

No impacts on fish are expected from the use of naled. According to the USEPA's *Naled Summary* published in 1999, "acute and chronic risk to freshwater and estuarine fish is not expected. There is potential for acute and some potential for chronic risks to freshwater invertebrates from all major uses of naled" (GFAFB 2003e).

Short-term, negligible impacts on mammalian and avian wildlife would be expected from the application of naled. A 1987 study summarized the persistence and hazard evaluation of naled on wildlife and concluded that naled has low environmental persistence, which minimizes prolonged exposure to wildlife. Additionally, no reported incidences of wildlife problems are attributable to naled, even though naled is commonly used in areas that provide wildlife habitat. However, wildlife mortalities in wetlands might be more difficult to detect than in agricultural areas (GFAFB 2003e).

A reduction in adult mosquitoes/flying insect numbers due to treatment would have negligible impact on bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon (GFAFB 2003e).

The aerial application of this chemical would have short-term, negligible to minor, direct, adverse impacts on wildlife due to noise disturbances from low-flying aircraft. High noise events could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, minor, adverse effects. Most wildlife species in the project area would be expected to quickly recover once the maintenance activities have ceased for the day and after the treatment is complete.

**Sensitive and Protected Species.** No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected.

A reduction in adult mosquitoes/flying insect numbers due to treatment would have negligible impact on migratory bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon.

**Wetland Habitat.** No impacts on wetland vegetation would be expected from the use of naled. Short-term, negligible to minor, direct, adverse impacts are expected to occur on wetland fauna from the application of naled, as discussed in the previous *Wildlife* section.

### Mavrik®

**Vegetation.** At the proposed rate of application, no evidence exists that suggests that Mavrik® would harm vegetation, and no phytotoxic activity would occur. Therefore, no impacts on vegetation would be expected from the use of Mavrik®.

**Wildlife.** Mavrik® has a low in toxicity to mammals because they are quickly broken down into inactive forms and pass from the body, and therefore a low potential for bioaccumulation (NPIC 1998). However, there is a low to moderate potential to accumulate in aquatic organisms. Mavrik® is highly toxic to fish and tadpoles, slightly toxic to birds, and is not toxic to bees (Cornell University 1996, NPIC 1998). Mavrik® would not be sprayed near water and contact with water would be avoided; therefore, no impacts on wildlife would be expected from the use of Mavrik®.

**Sensitive and Protected Species.** No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected. Mavrik® is highly toxic to northern leopard frog tadpoles; however, Mavrik® would not be sprayed near water.

A reduction in adult mosquitoes/flying insect numbers due to treatment would have negligible impact on migratory bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon.

**Wetland Habitat.** No impacts on wetland vegetation would be expected from the use of Mavrik®. Short-term, negligible to minor, direct, adverse impacts are expected to occur on wetland fauna from the application of Mavrik®, as discussed in the previous *Wildlife* section.

### **Anvil®, Kontrol 4-4, and Duet™**

**Vegetation.** At the proposed rate of application, no evidence exists that suggests that Anvil®, Kontrol 4-4, or Duet™ would harm vegetation, and no phytotoxic activity would occur. Therefore, no impacts on vegetation would be expected from the use of Anvil® or Duet™.

**Wildlife.** Anvil®, Kontrol 4-4, and Duet™, synthetic pyrethroids, are toxic to fish and aquatic invertebrates, but are not generally toxic to amphibians. In addition, storm water runoff from treated areas or the deposition of spray droplets into a body of water could be hazardous to fish and aquatic invertebrates. Grand Forks AFB would not apply Anvil® directly to water bodies. Anvil® is toxic to bees when they are exposed to directly treated blooming vegetation; however, dusk spraying would mitigate the issue because bees would likely be in the hive. Sumithrin is rapidly inactivated and decomposed by exposure to light and air with a half-life of less than one day in the air, and on plants and other surfaces subject to sunlight (MOHHS 2010).

Anvil® and other pyrethroid pesticides are toxic to terrestrial and aquatic invertebrates (e.g., dragonflies, beetles) and fish. Toxicity to aquatic organisms increases as the size of their habitat decreases (MOHHS 2010).

**Sensitive and Protected Species.** No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected.

A reduction in adult mosquitoes/flying insect numbers due to treatment would have negligible impact on migratory bird species in the proposed treatment area due to the type, diversity, and availability of organisms that they are known to feed upon.

**Wetland Habitat.** No impacts on wetland vegetation would be expected from the use of Anvil®, Kontrol 4-4, or Duet™. Short-term, negligible to minor, direct, adverse impacts are expected to occur on wetland fauna from the application of Anvil®, Kontrol 4-4, or Duet™, as discussed in the previous *Wildlife* section.

### **Adult Mosquito Physical and Biological Controls**

**Vegetation.** Long-term, negligible, direct, adverse impacts on vegetation would be expected due to the permanent removal of vegetation from the ditches during initial clearing and cleaning out of the ditches. Short-term, negligible to minor, adverse impacts on adjacent landscape vegetation are possible during maintenance activities. BMPs such as the proper use of machinery on soft or wet ground would be implemented during maintenance to minimize impacts on landscape vegetation. Additional areas disturbed as a result of ditch maintenance would be replanted with native vegetation or approved grass mixtures following maintenance activities.

Increasing the bat population on the installation through the increase in the number of bat boxes would result in a long-term, beneficial impact on vegetation because bats are pollinators and can disperse plant seeds.

**Wildlife.** Adult mosquito physical control would have short-term, negligible to minor, direct, adverse impacts on wildlife due to noise disturbances as a result of ditch maintenance and equipment use. High noise events could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, minor, adverse effects. Most wildlife species in the project area would be expected to recover quickly once the maintenance activities have ceased for the day and after the project is complete.

Maintenance activities associated with vegetation removal in the ditches could cause increased turbidity levels within water bodies due to runoff from cleared areas during maintenance, which might result in short-term, negligible to minor, adverse impacts on aquatic species. Long-term, minor, indirect, beneficial effects on aquatic species within the ditches would be expected from the elimination of standing water and the resulting improvement in water quality.

Introduction of additional bats to the installation through the installation of additional bat boxes would have a long-term, beneficial impact on wildlife as bats consume many pests and would also provide a food source for other mammals. Short- and long-term, negligible impacts on other pest-eating species, such as birds, could occur as competition for the pest food source increases. However, this is not anticipated to outweigh the beneficial impact of increasing the bat population as other food sources are available and the pest population at Grand Forks is adequate.

**Sensitive and Protected Species.** No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected. The USFWS has identified the gray wolf and the whooping crane as having the potential of occurring within the installation. No impacts on gray wolves or whooping cranes are anticipated from ditch maintenance activities. Any wolves that might occur on the installation would be transient and the Proposed Action would not remove any potential wolf habitat and would only cause temporary noise disturbance. It is highly unlikely that the wolf would be in the area during ditch maintenance. There is no suitable stopover feeding or roosting habitat for the whooping crane located within the installation.

The Migratory Bird Treaty Act (MBTA) and EO 13186 require Federal agencies to minimize or avoid impacts on migratory birds. BMPs, which are discussed for migratory birds, are recommended for reduction or avoidance of impacts on migratory bird species, including state-listed species, within the Project Area if trees are to be removed by the Proposed Action. Any ditch maintenance activities requiring tree removal should be performed before migratory birds return to Project Area or after all young have fledged to avoid incidental take (i.e., before 1 February or after 15 July). If ditch maintenance activities are scheduled to start during the period when migratory birds are present, a site-specific survey for nesting migratory birds should be performed immediately prior to the activities. If nesting birds are found during the survey, buffer areas should be established around nests. Activities should be deferred in buffer areas until birds have left the nest. Confirmation that all young have fledged should be made by a qualified biologist. If the Proposed Action were to result in adverse impacts on migratory birds, the impacts would likely be negligible from disturbances from noise. The implementation of BMPs would minimize any direct, adverse impacts on migratory birds, including state-listed species that might occur in the Project Area.

**Wetland Habitat.** BMPs including installation of silt fencing and hay bales, in addition to implementation of an erosion-and-sediment-control plan, would reduce the impact of ditch maintenance on wetland habitat. Activities would comply with EISA Section 438 and would be coordinated with the USACE, State of North Dakota, and the installation Environmental Office. Effects on wetland fauna would be similar to those described in the previous *Wildlife* discussion.

Adult mosquito physical control would have short-term, negligible to minor, direct, adverse impacts on wetland fauna due to noise disturbances as a result of ditch maintenance and equipment use.

Maintenance activities associated with vegetation removal in the ditches could cause increased turbidity levels within water bodies due to runoff from cleared areas during maintenance, which might result in short-term, negligible to minor, adverse impacts on aquatic species. Long-term, minor, indirect, beneficial effects on aquatic species within the ditches would be expected from the elimination of standing water and the resulting improvement in water quality.

## Noxious and Invasive Weed Control

**Vegetation.** The Proposed Action would have a direct impact on target vegetation (noxious and invasive weeds) by killing or slowing the growth of the target species. Mechanical removal would also have a direct impact on target vegetation. Long-term, indirect, beneficial effects on nontarget plant species (i.e., desired vegetation) would be expected by allowing them to compete better with the target species.

Since these herbicides bind to the soil until they are degraded, the likelihood that they would harm nearby plants is negligible. BMPs would be implemented to ensure Milestone® and Weed-B-Gone are not applied within or adjacent to water bodies; therefore, impacts on aquatic vegetation are anticipated to be negligible.

**Wildlife.** Noise from the application of herbicides via a spray tank attached to an all-terrain vehicle or from mechanical removal methods could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, minor, adverse effects. Most wildlife species on the installation would be expected to recover quickly once these activities have ceased for the day and after the applications are complete.

The impacts on wildlife from the application of the three products most likely to be used for noxious and invasive weed control are discussed in the following paragraphs.

**Rodeo®:** Short-term, negligible to minor, adverse impacts are expected to occur on wildlife from the application of Rodeo®. Several studies on the toxicity of glyphosate to different animal species indicated that glyphosate is poorly absorbed in the digestive tract and is largely excreted unchanged by mammals. In a study conducted on lab rats that were fed glyphosate for 3 weeks, only minute amounts of glyphosate were detected in the tissues 10 days after treatment (Cornell undated). Cows, chickens, and pigs fed small amounts had undetectable levels (less than 0.05 ppm) in muscle tissue and fat. Levels in milk and eggs were also undetectable (less than 0.025 ppm). Glyphosate is only slightly toxic to wild birds. The lethal concentration 50 (LC50) (i.e., the toxicity of a substance that will kill half of a sample population) in both mallards and bobwhite quail is greater than 4,500 ppm. The bioaccumulation factor in chicken muscle, fat, eggs, and liver was found to be extremely low (Cornell undated). Therefore, glyphosate has no significant potential to accumulate in animal tissue (Cornell undated).

Glyphosate is practically nontoxic to fish. An additive used in the Roundup® formulation (modified tallow amine used as a surfactant) is apparently more toxic to fish than many common surfactants. For this reason, the formulation for Rodeo® omits this ingredient. The surfactant is used to allow the compound to readily dissolve in solution and to keep the compound from balling up on the leaf surface. There is a very low potential for the compound to build up in the tissues of aquatic invertebrates or other aquatic organisms. Nearly all glyphosate residues were rapidly eliminated by fish that had been exposed for 10 to 14 days once these fish were transferred to glyphosate-free water. Glyphosate is also relatively nontoxic to honeybees (Cornell undated).

**Milestone®:** Short-term, negligible, adverse impacts are expected to occur on wildlife from the application of Milestone®. Aminopyralid has been shown to be practically nontoxic to birds, fish, honeybees, earthworms, and aquatic invertebrates, and is not expected to bioaccumulate in fish tissue.

There are no acute or chronic risks to fish, birds, mammals, and terrestrial and aquatic invertebrates (USEPA 2005). Aminopyralid's residual action should alleviate the need for repeat applications, resulting in a reduction in the amount of herbicides applied to the environment to control weeds (USEPA 2005).

**Weed-B-Gone:** Short-term, negligible to minor, adverse impacts are expected to occur on wildlife from the application of Weed-B-Gone. Weed-B-Gone is used for the self-help program on the installation. It is applied in very small amounts in the installation housing areas. The active ingredients in Weed-B-Gone are toxic to aquatic fauna and it should not be applied within or adjacent to water. The use of Weed-B-Gone would not be expected to result in adverse impacts on strictly aquatic fauna because no herbicide application would occur within or adjacent to any water bodies.

**Protected and Sensitive Species.** No federally listed threatened or endangered species are known to occur on the installation. Therefore, no impacts on federally listed threatened or endangered species would be expected. No impacts on gray wolves or whooping cranes are anticipated from the Proposed Action. Any wolves that might occur on the installation would be transient and the Proposed Action would not remove any potential wolf habitat and would only cause temporary noise disturbance. It is highly unlikely that the wolf would be in the area during spraying. The wolf typically hunts animals such as moose, deer, and beaver. Herbicidal spraying would not be expected to have an impact on their food supply.

Herbicide application should not occur in areas where any of the four state-ranked plants on the installation have been observed. These areas include the flightline fence in the southwestern portion of the installation (lesser yellow lady's slipper and white lady's slipper) and the northwestern part of the installation where Turtle Creek is present (eastern prickly gooseberry and Dutchman's breeches). These areas should not be sprayed for weeds without coordination from the Environmental Management Element. In addition, a plant species of concern, yellow lady's slipper, should be avoided during noxious weed spraying for BASH management and hay lease weed management operations (GFAFB 2010b). No impacts on the state-ranked plants are expected as the areas where they are found would not be treated.

**Wetland Habitat.** BMPs would be implemented to ensure Milestone® and Weed-B-Gone are not applied within or adjacent to wetlands. Activities would comply with EISA Section 438 and would be coordinated with the USACE, State of North Dakota, and the Environmental Management Office. Effects on wetland fauna would be similar to those described in the previous *Wildlife* discussion.

Noise from the application of herbicides via a spray tank attached to an all-terrain vehicle or from mechanical removal methods could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, minor, adverse effects. Most wildlife species on the installation would be expected to recover quickly once these activities have ceased for the day and after the applications are complete.

The impacts on wildlife from the application of the three products most likely to be used for noxious and invasive weed control are discussed in the following paragraphs.

**Rodeo®:** Short-term, negligible to minor, adverse impacts are expected to occur on wildlife from the application of Rodeo®. Several studies on the toxicity of glyphosate to different animal species indicated that glyphosate is poorly absorbed in the digestive tract and is largely excreted unchanged by mammals. In a study conducted on lab rats that were fed glyphosate for 3 weeks, only minute amounts of glyphosate were detected in the tissues 10 days after treatment (Cornell undated). Cows, chickens, and pigs fed small amounts had undetectable levels (less than 0.05 ppm) in muscle tissue and fat. Levels in milk and eggs were also undetectable (less than 0.025 ppm). Glyphosate is only slightly toxic to wild birds. The LC50 in both mallards and bobwhite quail is greater than 4,500 ppm. The bioaccumulation factor in chicken

muscle, fat, eggs, and liver was found to be extremely low (Cornell undated). Therefore, glyphosate has no significant potential to accumulate in animal tissue (Cornell undated).

Glyphosate is practically nontoxic to fish. An additive used in the Roundup® formulation (modified tallow amine used as a surfactant) is apparently more toxic to fish than many common surfactants. For this reason, the formulation for Rodeo® omits this ingredient. The surfactant is used to allow the compound to readily dissolve in solution and to keep the compound from balling up on the leaf surface. There is a very low potential for the compound to build up in the tissues of aquatic invertebrates or other aquatic organisms. Nearly all glyphosate residues were rapidly eliminated by fish that had been exposed for 10 to 14 days once these fish were transferred to glyphosate-free water. Glyphosate is also relatively nontoxic to honeybees (Cornell undated).

Milestone®: Short-term, negligible, adverse impacts are expected to occur on wildlife from the application of Milestone®. Aminopyralid has been shown to be practically nontoxic to birds, fish, honeybees, earthworms, and aquatic invertebrates, and is not expected to bioaccumulate in fish tissue. There are no acute or chronic risks to fish, birds, mammals, and terrestrial and aquatic invertebrates (USEPA 2005). Aminopyralid's residual action should alleviate the need for repeat applications, resulting in a reduction in the amount of herbicides applied to the environment to control weeds (USEPA 2005).

Weed-B-Gone: Short-term, negligible to minor, adverse impacts are expected to occur on wildlife from the application of Weed-B-Gone. Weed-B-Gone is used for the self-help program on the installation. It is applied in very small amounts in the installation housing areas. The active ingredients in Weed-B-Gone are toxic to aquatic fauna and it should not be applied within or adjacent to water. The use of Weed-B-Gone would not be expected to result in adverse impacts on strictly aquatic fauna because no herbicide application would occur within or adjacent to any water bodies.

### Off-Installation Properties

Impacts on off-installation properties for larval and adult mosquito chemical control would be similar to that described for Grand Forks AFB for chemicals that can be applied using an aerial application. One Federal candidate species, the Sprague's pipit, is found within the Crawford Oakville Prairie WMA. Two federal candidate species, the Sprague's pipit and the Dakota skipper, and one federally listed threatened species, the Western prairie fringed orchid may be found within East Grand Forks, Minnesota. Short-term, negligible, indirect, adverse impacts are expected to occur on these species from the application of the mosquito and noxious and invasive weed controls. Because of the infrequency of applications and concentrations of pesticide used for aerial adulticide applications, impacts to non – target species such as grasshoppers (an important food source for Sprague's pipits) would be negligible. Data would suggest that although non –target species populations may initially be reduced they rebound quickly in almost all instances (Blom 2011). Additionally, Bald eagles are known to nest within Kellys Slough NWR. Short-term, negligible, adverse impacts are expected on this population, as the mosquito and noxious and invasive weed controls used under the Proposed Action are minimally toxic to birds.

No impacts on off-installation properties would be expected from mosquito physical and biological controls or noxious and invasive weed control since this action would only occur on Grand Forks AFB.

### 3.5.5 No Action Alternative

Under the No Action Alternative, there would be no change from existing conditions at the installation, as described in **Section 3.5.2**. Short-term, negligible to minor, direct, adverse impacts on biological

resources would be anticipated due to the fact that invasive and nonnative plant species would continue to grow and decrease the amount of native vegetation on the installation.

## 3.6 Safety

### 3.6.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses both workers' health and public safety during demolition activities and facilities construction, and during subsequent operations of those facilities.

Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DoD and USAF regulations designed to comply with standards issued by Occupational Safety and Health Administration (OSHA) and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. This instruction applies to all USAF activities.

### 3.6.2 Existing Conditions

#### Grand Forks AFB

All contractors performing activities associated with the Proposed Action are responsible for following ground safety regulations and workers compensation programs and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment (PPE), and availability of Material Safety Data Sheets (MSDSs) (**Appendix B**). Chemical pesticides can be human skin irritants, eye irritants, and can cause allergic skin reactions after prolonged and repeated contact. Serious toxicological health effects can occur in humans, if exposed to high enough concentrations and under prolonged duration. This would most likely occur as a result of occupational exposure due to

mishandling of the material. It is therefore essential that all of the precautions set forth on the label and on the MSDSs be strictly followed.

Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplace operation; to monitor exposure to workplace chemicals (e.g., asbestos, lead, hazardous material), physical hazards (e.g., noise propagation), and biological agents (e.g., infectious waste); to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

Explosive safety clearance zones must be established around facilities used for the storage, handling, or maintenance of munitions. Air Force Manual 91-201 establishes the size of the clearance zone based upon QD criteria or the category and weight of the explosives contained within the facility. QD arcs on Grand Forks AFB are mostly in the southeastern portion of the installation and the northeastern side of the airfield. At Grand Forks AFB, there are QD arcs associated with the munitions storage area and the hazardous cargo parking pad.

Aerial spray operations have occurred at Grand Forks AFB and the surrounding townships for several decades; no life threatening mishap or crash has occurred with the USAF Reserve Aerial Spray group in any past spray operations conducted in the vicinity.

### **Off-Installation Properties**

Chemical applications under the Proposed Action would be within the boundaries of Grand Forks AFB and surrounding public areas. Because pesticide application for mosquitoes would occur in areas where human activity could be high, and the contractor would strictly adhere to all applicable safety guidelines outlined by the DoD and USAF. All procedures and guidelines described for the Proposed Action at Grand Forks would be followed for the off-installation properties.

### **3.6.3 Environmental Consequences**

#### **Evaluation Criteria**

Any increase in safety risks would be considered an adverse effect on safety. A proposed action could have a significant effect on health and safety if the following were to occur:

- A substantial increase in risks associated with the safety of construction personnel, contractors, or the local community
- A substantial hindrance in the ability to respond to an emergency
- Introduction of a new health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place.

### **3.6.4 Proposed Action**

Short-term, minor, adverse effects on safety would be expected from chemical application activities. Mavrik® can cause skin irritation and is corrosive to the eyes. Workers exposed to fluvalinate (the active ingredient in Mavrik®) have reported coughing, sneezing, throat irritation, itching or burning sensations on the arms or face with or without a rash, headache, and nausea. Pyrethroids can cause adverse effects on the central nervous system, liver, and kidneys (Cornell University 1996). For some people, short-term exposure to pyrethroids at low levels can exacerbate existing respiratory conditions (e.g., asthma) or

cause irritation of the eyes, skin, nose, throat or lungs, and exposure should be limited (MOHHS 2010). Synthetic pyrethroids such as Anvil®, Kontrol 4-4, and Duet™ would not cause adverse effects on human health in low doses, as is consistent with the recommended application rates on the pesticide labels (ATSDR 2003). Mild skin and eye irritation have been reported from direct contact with Vectobac®. However, eating plants or drinking water exposed to Vectobac® has not been shown to produce any ill effects in humans (NYCHMH 2012b).

Implementation of the Proposed Action would slightly increase the short-term risk associated with herbicide application contractors performing work at Grand Forks AFB during the normal workday because the area receiving herbicide treatment would be expanded and exposure time to herbicides would be longer. Chemical application contractors would be required to establish and maintain safety programs. The Proposed Action would not pose a safety risk to installation personnel or to activities at the installation. Residents within Grand Forks AFB and the off-installation treatment area would be notified prior to aerial application so that those conducting outdoor activities during that time can minimize unnecessary inhalation and dermal exposure to the pesticide.

Only USEPA- and Grand Forks AFB-approved herbicides and pesticides would be applied by licensed and trained applicators and all application rates and techniques would be followed according to label directions. All required PPE to prevent exposure to chemicals would be used. The use of mechanical equipment has the potential for minor, indirect impact on the safety of grounds maintenance crews from flying debris or injury from equipment accidents. Employees conducting mechanical treatments near roadways would be required to wear orange reflective safety vests to minimize potential accidents from inattentive drivers. Gloves would also be worn during treatments to avoid injury to hands. Chemical application activities would be accomplished in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Long-term, beneficial impacts on safety could occur from a slight reduction in the incidence of human illness caused by mosquito bites. In addition, beneficial impacts would be anticipated through the reduction of noxious and invasive weeds along roadways as visibility of roads, signs, vehicles, and pedestrians would improve. Control of weeds would also help to reduce the incidence of cracked runways, roadways, sidewalks, and other pavements due to weed growth, which would provide a more even, stable surface on which to travel.

Mechanical control of weeds within ditches would allow easier conveyance of floodwaters, which would reduce the threat of flooding and present a beneficial impact on human health and safety.

### **3.6.5 No Action Alternative**

Under the No Action Alternative, there would be no change from existing conditions. The Mosquito Control Management Plan would not be implemented and herbicide application of noxious weeds would not be expended. Long-term, minor, adverse impacts on safety would be anticipated from the continued growth of weeds that could inhibit roadway visibility and compromise the integrity of runways, roadways, sidewalks, and other pavement. Integrated control of mosquitoes would not occur, and mosquito-related human illness would continue and could increase, depending on the abundance of mosquitoes in the area. Vegetation would not be removed from drainage ditches, which provides breeding habitat for mosquitoes and increases the chances of flooding because water conveyance potential would slow.

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## 4. Cumulative and Other Effects

### 4.1 Definition of Cumulative Effects

CEQ defines cumulative effects as the “impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative effects resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with respect to their effects.

### 4.2 Projects Considered for Potential Cumulative Effects

The geographic region of influence (ROI) is an important consideration when discussing cumulative effects. For the purposes of this analysis, the ROI was determined to be Grand Forks AFB and the adjacent communities (i.e., Grand Forks Metropolitan Area and Grand Forks County).

The Grand Forks Metropolitan Area is at the eastern-central portion of Grand Forks County and serves as a regional center for northeastern North Dakota and northwestern Minnesota. Agriculture is the most important industry in Grand Forks County and the majority of the economy is driven by the generation or processing of agricultural products. Government services are also an important segment of the local economy. Overall, the future vision for Grand Forks County is to promote the majority of growth where municipal services are available and manage rural residential growth, while preserving agricultural and native resources. The vision for Grand Forks County is to develop a cohesive countywide land use pattern that ensures compatibility and functional relationships among activities and between jurisdictions. Future land use plans include the following (Grand Forks County 2006):

- The Urban Expansion Area, adjacent to the Grand Forks Metropolitan Area, is anticipated to receive municipal services within the next 50 years. The Urban Expansion Area would be sized to accommodate growth through 2055.
- The aesthetics and environmental quality within the commercial and industrial land use area would be maintained and upgraded, where necessary.
- Growth occurring on a phased-basis, providing for a logical extension of urban and rural growth patterns and related community services.

An effort was undertaken to identify other projects for evaluation in the context of the cumulative effects analysis. This was further developed through review of public documents and information gained from the coordination with various applicable agencies.

There are no formal projects proposed within or immediately adjacent to the project area other than the Proposed Action. However, there are some actions that take place on an occasional basis (see **Table 4-1**). The actions shown in **Table 4-1** are anticipated to continue on an occasional basis over the next 5 years.

**Table 4-1. Past, Present, and Future Actions Within and Immediately Adjacent to Grand Forks AFB**

Action	Description
Bow Hunting	Bow hunting is conducted within the northwestern corner of the installation during scheduled hunting seasons each fall.
Training	Grand Forks AFB, Reserve Officer Training Corps, and National Guard forces conduct training exercises. This training can consist of battle drills in preparation for upcoming missions. No live or blank ammunition is used during these training exercises. All training exercises are conducted during daylight hours. No fires, earth-moving activities, or heavy equipment is allowed during these exercises. BMPs are recommended to prevent the spread of invasive species, and to give consideration for several species of concern and migratory birds.
Forest Management	Grand Forks AFB occasionally conducts forest management activities within the northwestern corner of the installation, including surveying species, removing infected trees and trees deemed a safety hazard, nonnative invasive and noxious species surveys and management, trash removal, tree and shrub planting, tree transplanting, or removal for all trees which penetrate the 7 to 1 imaginary surface approach zone of the airfield.
Riparian Restoration	Grand Forks AFB is proposing to restore the streambank of the Turtle River in the northwestern corner of the installation to control erosion and sedimentation by stabilizing the streambank.
Beaver Control	Grand Forks AFB occasionally traps or relocates beavers.
Haying	Grand Forks AFB conducts vegetative management control by mowing hay and grass species adjacent to the riparian area.
Various Demolition and Construction Projects	Grand Forks AFB continues to demolish, construct, and renovate its structures, including: renovation and repair of the airfield lighting system, demolition of the Freedom Hall Dormitory, demolition and consolidation of munitions maintenance facilities, and repairs to the south taxiways.

The actions presented in **Table 4-1** would be expected to occur concurrently, if implemented with the Proposed Action. Some of these actions could result in effects on air quality as a result of ground disturbance that would produce fugitive dust, and use of heavy construction equipment that would produce air emissions. However, these effects on air quality would be limited to Grand Forks AFB. In addition, effects on air quality would be of a finite duration, lasting only during the period associated with ground-disturbing activities. Effects on soils and water resources could occur from ground-disturbing activities during site preparation when soils could be eroded and sedimentation of nearby water bodies could occur. Effects would be reduced by implementing BMPs as described in **Chapter 3**. Furthermore, there are no projects proposed at the installation that would be affected by the Proposed Action nor would the Proposed Action affect any projects proposed at the installation.

### 4.3 Cumulative Effects on Resource Areas

**Table 4-2** summarizes potential cumulative effects on the various resource areas from the Proposed Action when combined with other past, present, and reasonably foreseeable future activities, as presented in **Table 4-1**.

### 4.4 Compatibility of Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

Impacts on the ground surface as a result of the Proposed Action would occur entirely within the boundaries of Grand Forks AFB. Construction activities would not result in any significant or incompatible land use changes on- or off-installation. The Proposed Action would be consistent with current and future land use zones. Furthermore, the Proposed Action would not conflict with any applicable land use ordinances or designated clear zones off Grand Forks AFB.

### 4.5 Relationship Between Short-Term Uses of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

Short-term uses of the biophysical components of human environment include direct disturbances and impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in an intensification of land use at Grand Forks AFB and in the surrounding area. Implementation of the Proposed Action would not represent a significant loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts. Long-term productivity would be increased by the implementation of the Proposed Action.

### 4.6 Irreversible and Irrecoverable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of energy resources and changes to biological habitat and wetlands. The use of these resources is considered to be permanent.

**Energy Resources.** No significant impacts would be expected on energy resources used as a result of the Proposed Action, though any energy resources consumed would be irretrievably lost. These include petroleum-based products (e.g., gasoline and diesel). During application of pesticides, gasoline or diesel would be used for the operation of privately owned and government-owned vehicles, and propane is used in mosquito magnet traps. Consumption of energy resources would not place a significant demand on their availability in the region.

Table 4-2. Cumulative Effects on Resource Areas

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Air Quality	Grand Forks County is classified as being in attainment or as unclassifiable for all criteria pollutants.	Emissions from aircraft, vehicles, and stationary sources such generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coating/paint booths, and miscellaneous chemical usage.	Potential drift during pesticide application activities.	Continued renovation and demolition could cause temporary effects. Continued increase in small arms range use and aircraft operations could result in long-term effects.	Short-term, negligible to minor, adverse effects on air quality. No significant effects.
Geological Resources	Soils moderately impacted from previous disturbance and modification.	Storm water-control measures that favor infiltration are used to minimize erosion and sedimentation during storm events.	Short-term, negligible, adverse impacts on soils if pesticides do not decompose quickly. Long-term, beneficial impacts from pesticides that are broken down by microbial action, thereby helping to sustain the soil productivity.	Continued demolition and construction could temporarily increase soil runoff and sedimentation. Continued clearing of vegetation could result in complete removal of soil or soil modification.	No significant effect.
Water Resources	Surface water quality moderately impacted by past construction and demolition activities.	Pollution from industrial and municipal sources is generally moderate.	Short- and long-term, minor, adverse impacts on water quality from the introduction of certain pesticides into the water column.	Continued development of area could result in temporary sedimentation.	No significant effect.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
<b>Biological Resources</b>	Degraded habitat of sensitive and common wildlife species. No Federal-listed species or significant habitat present. Occasional use by state-listed species, species of concern, and migratory birds.	Presence and operation of facilities impact wildlife and their habitat, state-listed species, species of concern, and migratory birds.	Minor disturbance of vegetation and habitat during drainage maintenance. No effects on wetlands. No significant habitat for threatened and endangered species. Long-term, beneficial effects on native vegetation from the use of targeted herbicide on nonnative vegetation.	Continued development of area could impact vegetation communities, wildlife habitat, and wetlands. Continued development of area could have minor effects on state-listed species, species of concern, migratory birds, and their occasional-use habitat.	Direct, minor effects from the permanent loss of vegetation, habitat from future actions. Permanent loss of occasional-use habitat by threatened and endangered species would be minimized through continued natural resources management. No significant effect.
<b>Safety</b>	Grand Forks AFB has abided by Federal and state health and safety regulations.	Non-airfield development constrained in clear zones, accident potential zones, and imaginary surfaces. QD arcs constrained for safety reasons.	Short-term, negligible to minor, adverse effects on safety could occur while pesticides are being applied. Long-term, beneficial effects on safety would occur from a reduced risk of disease from mosquitoes.	Continued renovation, demolition, construction, and application of pesticides could cause temporary safety risks.	There is a short-term increase in the risk to contractors during construction, demolition, and pesticide application activities, especially within QD arcs. No long-term or significant effects.

**Biological Habitat.** The Proposed Action would temporarily result in the loss of some vegetation and wildlife habitat at the proposed application areas. Herbicide applications would remove vegetation, but it would target nonnative weed species, the removal of which could indirectly benefit native species.

**Wetlands and Waters of the United States.** The Proposed Action has a negligible to minor potential to contribute to adverse cumulative effects on water quality when considered in conjunction with other ongoing activities. The Proposed Action would temporarily result in minor losses of waters of the United States (i.e., Turtle River) at the proposed application areas; however, the functions and values of floodplains and wetlands adjacent to the Turtle River would be enhanced by the Proposed Action; therefore, the minor losses of waters of the United States compared to the beneficial effects of the Proposed Action would be negligible.

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## **APPENDIX A**

**INTERAGENCY AND INTERGOVERNMENTAL COORDINATION  
FOR ENVIRONMENTAL PLANNING (IICEP), NATIVE AMERICAN TRIBAL  
CONSULTATION, AND PUBLIC INVOLVEMENT CORRESPONDENCE**



## **Interagency and Intergovernmental Coordination for Environmental Planning Distribution List**

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- |    |  |    |  |
|----|--|----|--|
| 1  | North Dakota State Water Commission      | 36 | Dr. Terry Dwelle, State Health Officer |
| 2  | 900 E Boulevard Avenue, Dept 770         | 37 | North Dakota Department of Health      |
| 3  | Bismarck, ND 58505-0850                  | 38 | 600 E Boulevard Avenue                 |
| 4  | Mr. Jeff Towner                          | 39 | Department 301                         |
| 5  | U.S. Fish and Wildlife Service           | 40 | Bismarck, ND 58505-0200                |
| 6  | North Dakota Field Office                |    |  |
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| 14 | Mr. Terry Steinwand, Commissioner        |    |  |
| 15 | North Dakota Game and Fish               |    |  |
| 16 | 100 North Bismarck Expressway            |    |  |
| 17 | Bismarck, ND 58505-5095                  |    |  |
| 18 | Mr. Merlen E. Paaverud                   |    |  |
| 19 | State Historic Preservation Officer      |    |  |
| 20 | State Historical Society of North Dakota |    |  |
| 21 | 612 East Boulevard Avenue                |    |  |
| 22 | Bismarck, ND 58505-0830                  |    |  |
| 23 | U.S. Department of Agriculture           |    |  |
| 24 | Natural Resources Conservation Service   |    |  |
| 25 | 4775 Technology Circle #1B               |    |  |
| 26 | Grand Forks, ND 58203-5635               |    |  |
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DEPARTMENT OF THE AIR FORCE  
319TH CIVIL ENGINEER SQUADRON  
525 TUSKEGEE AIRMEN BLVD  
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

MEMORANDUM FOR DISTRIBUTION

[STAMP DATE]

FROM: 319 CES/CD  
525 Tuskegee Airmen Boulevard  
Grand Forks AFB, North Dakota 58205-6434

SUBJECT: Draft Environmental Assessment Addressing the Integrated Control of Nuisance Species at Grand Forks Air Force Base (AFB), North Dakota and Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA)

The 319th Air Base Wing (319 ABW) at Grand Forks AFB, North Dakota and Headquarters Air Mobility Command (AMC) are preparing the Environmental Assessment (EA) addressing the treatment of nuisance species, including mosquitoes and noxious and invasive weeds. The Proposed Action addressed in this EA is to manage and control mosquitoes and noxious and invasive weeds species to improve the quality of the human and natural environment at Grand Forks AFB and the surrounding area.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation and solicit comments on the attached Draft EA and FONSI/FONPA for this Proposed Action. Please provide your comments within 30 days from receipt of this correspondence. Comments may include any issues or concerns related to the Proposed Action. Also enclosed is a copy of the distribution list of other Federal, state, and local agencies to be contacted regarding this Proposed Action. If you feel there are any additional agencies that should review and comment on the proposal, please feel free to include them in your distribution of this letter and the attached materials.

Please provide any comments or information directly to the 319 CES/CEAO, 525 Tuskegee Airmen Boulevard, Grand Forks AFB, ND 58205-6434, within 30 days from the date of this correspondence. If members of your staff have any questions, the point-of-contact is Ms. Diane Strom (319 CES/CEAO), who can be reached at 701-747-6394, or by email at [diane.strom@us.af.mil](mailto:diane.strom@us.af.mil). Thank you for your assistance.

Sincerely,

MARY C. GILTNER  
Deputy Base Civil Engineer

Attachments:

1. Draft Environmental Assessment and Finding of No Significant Impact
2. Distribution List



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 319TH AIR BASE WING (AMC)  
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

JUN 16 2011

MEMORANDUM FOR DISTRIBUTION

FROM: 319 CES/CD  
525 Tuskegee Airmen Boulevard  
Grand Forks AFB, North Dakota 58205-6434

MCH  
19 July  
CEA ✓

SUBJECT: Final Description of the Proposed Action and Alternatives for an Environmental Assessment  
Addressing the Integrated Control of Nuisance Species at Grand Forks Air Force Base  
(AFB), North Dakota

1. The 319th Air Base Wing (319 ABW) at Grand Forks AFB, North Dakota and Headquarters Air Mobility Command (AMC) are preparing the Environmental Assessment (EA) addressing the treatment of nuisance species, including mosquitoes and noxious and invasive weeds. The Proposed Action addressed in this EA is to manage and control mosquitoes and noxious and invasive weeds species to improve the quality of the human and natural environment at Grand Forks AFB and the surrounding area.
2. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation and solicit comments on the attached Description for the Proposed Action and Alternatives. Please provide your comments within 30 days from receipt of this correspondence. Comments may include any issues or concerns related to the Proposed Action. Also enclosed is a copy of the distribution list of other Federal, state, and local agencies to be contacted regarding this Proposed Action. If you feel there are any additional agencies that should review and comment on the proposal, please feel free to include them in your distribution of this letter and the attached materials.
3. Please provide any comments or information directly to the 319 CES/CEAO, 525 Tuskegee Airmen Boulevard, Grand Forks AFB, ND 58205-6434, within 30 days from the date of this correspondence. If members of your staff have any questions, the point-of-contact is Ms. Diane Strom (319 CES/CEAO), who can be reached at 701-747-6394, or by email at diane.strom@us.af.mil. Thank you for your assistance.

Sincerely

MARY O. GILTNER  
Deputy Base Civil Engineer

U.S. FISH AND WILDLIFE SERVICE	
ECOLOGICAL SERVICES	
ND FIELD OFFICE	
Project as described will have no significant impact on fish and wildlife resources. No endangered or threatened species are known to occupy the project area. IF PROJECT DESIGN CHANGES ARE MADE, PLEASE SUBMIT PLANS FOR REVIEW.	
7/15/11	 Jeffrey K. Towner Field Supervisor
Date	

es



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Community Services    Economic Development & Finance    **Tourism**    Workforce Development

June 22, 2011

Diane Strom  
Dept. of the Air Force  
319 CES/CEAO  
525 Tuskegee Airmen Blvd.  
Grand Forks AFB, ND 58205-6434

"Letter of Clearance" In Conformance with the North Dakota Federal Program Review System -  
State Application Identifier No.: ND110622-0219

Dear Ms. Strom:

SUBJECT: Final Description of the Proposed Action and Alternatives for an EA Addressing the  
Integrated Control of Nuisance Species at GFAFB, North Dakota

The above referenced notice has been reviewed through the North Dakota Federal Program  
Review Process. As a result of the review, clearance is given to the project only with respect to  
this consultation process.

If the proposed project changes in duration, scope, description, budget, location or area of  
impact, from the project description submitted for review, then it is necessary to submit a copy of  
the completed application to this office for further review.

We also request the opportunity for complete review of applications for renewal or continuation  
grants within one year after the date of this letter.

Please use the above SAI number for reference to the above project with this office. Your  
continued cooperation in the review process is much appreciated.

Sincerely,

A handwritten signature in blue ink that reads "James R. Boyd".

James R. Boyd  
Manager of Governmental Services  
Division of Community Services

bb

*"We lead North Dakota's efforts to attract, retain and expand wealth."*

---

1600 E. Century Avenue, Suite 2 • P.O. Box 2057 • Bismarck, ND 58502-2057  
Phone: 701-328-5300 • 1-866-4DAKOTA • Fax: 701-328-5320 • [www.ndcommerce.com](http://www.ndcommerce.com)

Relay North Dakota: 1-800-366-6888 TTY • 1-800-366-6889 Voice

*Received 24 Jun 11*



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
CORPS OF ENGINEERS, OMAHA DISTRICT  
NORTH DAKOTA REGULATORY OFFICE  
1513 SOUTH 12<sup>TH</sup> STREET  
BISMARCK ND 58504-6640

June 22, 2011

North Dakota Regulatory Office

319 CES/CEAO  
Attn: Ms. Diane Strom  
525 Tuskegee Airmen Boulevard  
Grand Forks AFB, North Dakota 58205-6434

Dear Ms Strom:

This is in response to a letter received June 21, 2011 requesting Department of the Army, U.S. Army Corps of Engineers (Corps) comments an Environmental Assessment addressing the Integrated Control of Nuisance Species at Grand Forks Air Force Base (AFB), North Dakota.

Corps regulatory offices administer Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act regulates work impacting navigable waters. Work over, in, or under navigable waters is considered to have an impact. Section 404 of the Clean Water Act regulates the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in the waters of the United States.

Please submit a location map and completed Corps permit application (copy enclosed) describing all proposed work and construction methodology, to the letterhead address if a Section 10/404 permit is required.

Do not hesitate to contact this office by letter or telephone (701-255-0015) if we can be of further assistance.

Sincerely,

Daniel E. Cimarosty  
Regulatory Program Manager  
North Dakota

Enclosure

Printed on Recycled Paper

*Received 27 Jun 11.*

**Instructions for Preparing a  
Department of the Army Permit Application**

**Blocks 1 through 4.** To be completed by Corps of Engineers.

**Block 5. Applicant's Name.** Enter the name and the E-mail address of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the name of the organization and responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked Block 5.

**Block 6. Address of Applicant.** Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 6.

**Block 7. Applicant Telephone Number(s).** Please provide the number where you can usually be reached during normal business hours.

**Blocks 8 through 11.** To be completed, if you choose to have an agent.

**Block 8. Authorized Agent's Name and Title.** Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, or any other person or organization. Note: An agent is not required.

**Blocks 9 and 10. Agent's Address and Telephone Number.** Please provide the complete mailing address of the agent, along with the telephone number where he / she can be reached during normal business hours.

**Block 11. Statement of Authorization.** To be completed by applicant, if an agent is to be employed.

**Block 12. Proposed Project Name or Title.** Please provide name identifying the proposed project, e.g., Landmark Plaza, Burned Hills Subdivision, or Edsall Commercial Center.

**Block 13. Name of Waterbody.** Please provide the name of any stream, lake, marsh, or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

**Block 14. Proposed Project Street Address.** If the proposed project is located at a site having a street address (not a box number), please enter it here.

**Block 15. Location of Proposed Project.** Enter the latitude and longitude of where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked Block 15.

**Block 16. Other Location Descriptions.** If available, provide the Tax Parcel Identification number of the site, Section, Township, and Range of the site (if known), and / or local Municipality that the site is located in.

**Block 17. Directions to the Site.** Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site. You may also provide description of the proposed project location, such as lot numbers, tract numbers, or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known

**Block 18. Nature of Activity.** Describe the overall activity or project. Give appropriate dimensions of structures such as wing walls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles, or float-supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 18.

**Block 19. Proposed Project Purpose.** Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

**Block 20. Reasons for Discharge.** If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

**Block 21. Types of Material Being Discharged and the Amount of Each Type in Cubic Yards.** Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

**Block 22. Surface Areas of Wetlands or Other Waters Filled.** Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked Block 22.

**Block 23. Description of Avoidance, Minimization, and Compensation.** Provide a brief explanation describing how impacts to waters of the United States are being avoided and minimized on the project site. Also provide a brief description of how impacts to waters of the United States will be compensated for, or a brief statement explaining why compensatory mitigation should not be required for those impacts.

**Block 24. Is Any Portion of the Work Already Complete?** Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization, if possible.

**Block 25. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site.** List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked Block 24.

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county or counties where the project is to be developed.

**Block 26. Information about Approvals or Denials by Other Agencies.** You may need the approval of other federal, state, or local agencies for your project. Identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

**Block 27. Signature of Applicant or Agent.** The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

#### **DRAWINGS AND ILLUSTRATIONS**

##### **General Information.**

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View or a Typical Cross-Section Map. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8½ x11 inch plain white paper (electronic media may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross-section). While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information.

**U.S. ARMY CORPS OF ENGINEERS  
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT  
(33 CFR 325)**

OMB APPROVAL NO. 0710-0003  
EXPIRES: 31 AUGUST 2012

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

**PRIVACY ACT STATEMENT**

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

**(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)**

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
--------------------	----------------------	------------------	------------------------------

**(ITEMS BELOW TO BE FILLED BY APPLICANT)**

5. APPLICANT'S NAME  First -                   Middle -                   Last -  Company -  E-mail Address -	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)  First -                   Middle -                   Last -  Company -  E-mail Address -
6. APPLICANT'S ADDRESS:  Address -  City -                   State -                   Zip -                   Country -	9. AGENT'S ADDRESS:  Address -  City -                   State -                   Zip -                   Country -
7. APPLICANT'S PHONE NOS. w/AREA CODE  a. Residence              b. Business              c. Fax	10. AGENTS PHONE NOS. w/AREA CODE  a. Residence              b. Business              c. Fax

**STATEMENT OF AUTHORIZATION**

11. I hereby authorize, \_\_\_\_\_ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

\_\_\_\_\_  
SIGNATURE OF APPLICANT

\_\_\_\_\_  
DATE

**NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY**

12. PROJECT NAME OR TITLE (see instructions)

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)  Address
15. LOCATION OF PROJECT Latitude: •N                   Longitude: •W	City -                   State -                   Zip -
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID                   Municipality Section -                   Township -                   Range -	

17. DIRECTIONS TO THE SITE

18. Nature of Activity (Description of project, include all features)

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

**USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
-------------------------------	-------------------------------	-------------------------------

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres

or

Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

24. Is Any Portion of the Work Already Complete?  Yes  No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address-

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

\* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT \_\_\_\_\_ DATE \_\_\_\_\_ SIGNATURE OF AGENT \_\_\_\_\_ DATE \_\_\_\_\_

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguise a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.



LAW

Jack Dalrymple  
Governor of North Dakota

June 24, 2011

North Dakota  
State Historical Board

Ms. Mary C. Giltner  
Deputy Base Civil Engineer  
319<sup>th</sup> Civil Engineer Squadron/CESO  
525 Tuskegee Airmen Boulevard  
Grand Forks AFB, North Dakota 58205-6434

MCL  
24 Jun 11  
CEA

Chester E. Nelson, Jr.  
Bismarck - President

Gerold Germtholz  
Valley City - Vice President

Richard Kloubec  
Fargo - Secretary

Albert I. Berger  
Grand Forks

Calvin Grinnell  
New Town

Diane K. Larson  
Bismarck

A. Ruric Todd III  
Jamestown

Sara Otte Coleman  
Director  
Tourism Division

Kelly Schmidt  
State Treasurer

Alvin A. Jaeger  
Secretary of State

Mark A. Zimmerman  
Director  
Parks and Recreation Department

Francis Ziegler  
Director  
Department of Transportation

Merlan E. Paaverud, Jr.  
Director

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ND SHPO 11-1093A: EA Addressing the Integrated Control of Nuisance Species at  
Grand Forks Air Force Base, North Dakota

Dear Ms. Giltner,

We reviewed ND SHPO 11-1093A: EA Addressing the Integrated Control of  
Nuisance Species at Grand Forks Air Force Base, North Dakota, and concur with a "No  
Historic Properties Affected" determination, provided the project remains as described  
in Mary Giltner's letter date stamped June 16, 2011 and the CD "Final DOPAA for an  
EA Addressing Integrated Control of Nuisance Species at GR AFB, ND."

Thank you for the opportunity to review this project. If you have any questions please  
contact Susan Quinnell, at (701) 328-3576 or [squinnell@nd.gov](mailto:squinnell@nd.gov). Thank you for the  
excellent documentation package, and the opportunity to review.

Sincerely,

Merlan E. Paaverud, Jr.  
State Historic Preservation Officer (North Dakota)



ENVIRONMENTAL HEALTH SECTION  
Gold Seal Center, 918 E. Divide Ave.  
Bismarck, ND 58501-1947  
701.328.5200 (fax)  
[www.ndhealth.gov](http://www.ndhealth.gov)



June 30, 2011

Ms. Diane M. Strom  
319 CES/CEAO  
525 Tuskegee Airmen Blvd.  
Grand Forks AFB, ND 58205-6434

Re: Final DOPPA for an Environmental Assessment Addressing the Integrated Control of Nuisance Species at Grand Forks Air Force Base, Grand Forks County

Dear Ms. Strom:

This department has reviewed the information concerning the above-referenced project submitted under date of June 16, 2011, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed project will be minor and can be controlled by proper application methods. With respect to pesticide and herbicide application, we have the following comments:

1. Care must be taken during the application of pesticides to prevent drift of the pesticide from the area where it is being applied. Disposal of surplus pesticides and empty pesticide containers must be in accordance with NDAC 33-15-10-02.
2. Care is to be taken during application activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

A handwritten signature in black ink.

L. David Glatt, P.E., Chief  
Environmental Health Section

LDG:cc  
Attach.

Environmental Health  
Section Chief's Office  
701.328.5150

Division of  
Air Quality  
701.328.5188

Division of  
Municipal Facilities  
701.328.5211

Division of  
Waste Management  
701.328.5166

Division of  
Water Quality  
701.328.5210

*Printed on recycled paper.*

## **Native American Tribal Consultation Distribution List**

---

Spirit Lake Tribe  
Myra Pearson, Chairwoman  
P.O. Box 359  
Fort Totten, ND 58335

Standing Rock Sioux Tribe  
Charles W. Murphy, Chairman  
P.O. Box D  
Fort Yates, ND 58538

Three Affiliated Tribes  
Tex G. Hall, Chairman  
Fort Berthold Indian Reservation  
404 Frontage Road  
New Town, ND 58763-9402

Turtle Mountain Band of Chippewa Indians  
Merle St. Claire, Chairman  
Cory LaVallie, Administrative Assistant  
4180 Highway 281  
Belcourt, ND 58316

Cheyenne River Sioux Tribe  
Kevin Keckler, Sr., Chairman  
P.O. Box 590  
Eagle Butte, SD 57625

Crow Creek Sioux Tribe  
Duane Big Eagle  
P.O. Box 50  
Fort Thompson, SD 57339-0050

Flandreau Santee Sioux Tribe  
Anthony Reider, President  
P.O. Box 283  
Flandreau, SD 57028

Lower Brule Sioux Tribe  
Michael Jandreau, Chairman  
P.O. Box 187  
Lower Brule, SD 57548-0187

Oglala Sioux Tribe  
John Yellow Bird Steele, President  
P.O. Box 2070  
Pine Ridge, SD 57770-2070

Rosebud Sioux Tribe  
Rodney Bordeaux, Chairman  
P.O. Box 430  
Rosebud, SD 57570-0430

Sisseton-Wahpeton Oyate  
Robert Shepherd, Chairman  
P.O. Box 509  
Agency Village, SD 57262-0509

Yankton Sioux Tribe  
Robert Cournoyer, Chairman  
P.O. Box 248  
Marty, SD 57361-0248

Minnesota Chippewa Tribe  
Bois Forte Band of Chippewa  
Kevin Leecy, Chairman  
5344 Lakeshore Drive  
Nett Lake, MN 55772

Minnesota Chippewa Tribe  
Fond du Lac Band of Chippewa  
Karen R. Diver, Chairwoman  
1720 Big Lake Road  
Cloquet, MN 55720

Minnesota Chippewa Tribe  
Leech Lake Band of Ojibwe  
Arthur LaRose, Chairman  
115 6th Street NW, Suite E  
Cass Lake, MN 56633

Minnesota Chippewa Tribe  
White Earth Ojibwe  
Erma Vizenor, Chairwoman  
White Earth, MN 56591

Minnesota Chippewa Tribe  
Mille Lacs Band of Ojibwe  
Marge A. Anderson, Chief Executive  
43408 Oodena  
Onamia, MN 56359

Minnesota Chippewa Tribe  
Grand Portage Band  
P.O. Box 428  
Grand Portage, MN 55605

Red Lake Band of Chippewa Indians  
Floyd "Buck" Jourdain, Chairman  
P.O. Box 550  
Red Lake, MN 56671

Shakopee Mdewakanton Sioux Community  
Stanley R. Crooks, Chairman  
2330 Sioux Trail NW  
Prior Lake, MN 55372

Upper Sioux Indian Community  
Kevin Jensvold, Chairman  
P.O. Box 147  
Granite Falls, MN 56241

Lower Sioux Indian Community  
Gabe Prescott, President  
P.O. Box 308  
Morton, MN 56270

Prairie Island Indian Community  
Victoria Winfrey, President  
5636 Sturgeon Lake Road  
Welch, MN 550889

### **Summary of Comments Received on the DOPAA by Native American Tribes**

During early consultation efforts, in accordance with Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, the installation received a comment from a Native American tribe regarding the extent of cultural resources surveys within the action area. The tribe requested monitoring actions for any ground disturbing activities occurring in areas that had not been surveyed. In accordance with the GFAFB *Integrated Cultural Resources Management Plan*, the installation would conduct cultural resources monitoring in the riparian or CE park area by a qualified archaeologist. Monitoring would be conducted in accordance with the SHSND during any required clearing and earth-disturbing activities scheduled for nuisance species control work in this area. No other tribe provided comments on this action.

## **Public Distribution List**

---

### **Beekeepers**

Andrew L. Terry, Lillie Terry, and Tony Terry  
1693 Oak Street NE  
Emerado, ND 58228-9796

Paul Reece  
12848 County Road  
Farwell, MN 56327-8143

Douglas Perkins  
188 47th Street NE  
Aneta, ND 58121-9607

Robert and Nathan Larimore  
P.O. Box 456  
Larimore, ND 58251-0456

John D. and Betty K. Kauk  
P.O. Box 6122  
Grand Forks, ND 58206-6122

Conrad L. Dietzler  
2225 37th Street NE  
Larimore, ND 58251-9731

# Sample Community Letter



**DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 319TH AIR BASE WING (AMC)  
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

MEMORANDUM FOR: SEE DISTRIBUTION LIST

NOV 27 2012

FROM: 319 CES/CD  
525 Tuskegee Airmen Boulevard  
Grand Forks AFB, ND North Dakota 58205-6434

SUBJECT: Environmental Assessment, Integrated Control of Nuisance Species at Grand Forks Air Force Base

Grand Forks Air Force Base (GFAFB) is revising its Environmental Assessment (EA) to control nuisance species including aerial pesticide application for mosquito control. Please review the attached EA and provide any comments within 30 days of this letter. The EA is also posted on the web at <http://www.grandforks.af.mil/library/index.asp>. In the past, GFAFB reached out to surrounding communities and offered aerial mosquito sprays when aircraft time and weather conditions permitted. Communities were required to sign hold-harmless agreements to allow AF Reserve aircraft to fly over to apply your purchased mosquito chemical in an aerial spray. New Environmental Protection Agency (EPA) regulation states that residual sprays applied to surface waters are considered a point-source discharge, now requiring a National Pollutant Discharge Elimination System (NPDES) permit.

As a Federal facility, GFAFB has filed a Notice of Intent (NOI) online with the ND Department of Health and complies with all ND General Permit reporting and monitoring conditions. Details of the General Permit, NOI and Pesticide Discharge Management Plan can be found at <http://www.ndhealth.gov/WQ/WasteWater/Pesticide/Pesticide.htm>. Another informational site is at [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=410#permit](http://cfpub.epa.gov/npdes/home.cfm?program_id=410#permit).

Activities in the NOI are restricted to GFAFB property/federal jurisdiction. To participate in GFAFB larvicide and adulticide aerial sprays, regional communities must receive permission to discharge pesticides via a ND Pesticide Discharge General Permit. At a minimum, this requires participants to file a Notice of Application and adopt pest management measures. This includes completing a request form found in the EA appendix titled "Innovated Readiness Training Request for Military Assistance". Communities must also sign a hold-harmless agreement and purchase the necessary pesticide as noted on the form. GFAFB recognizes the added burden these requirements place upon communities wishing to continue participation in aerial mosquito control, but is bound by federal and state regulation.

Please provide any comments or questions on the EA directly to 319 CES/CEAO, 525 Tuskegee Airmen Blvd, Grand Forks AFB, ND 58205 within 30 days of receipt of this letter. If members of your staff have any questions, contact Ms. Diane Strom at (701) 747-6394 or by email at [diane.strom@us.af.mil](mailto:diane.strom@us.af.mil). Thank you for your assistance.

Sincerely,

MARY O. GILTNER  
Deputy Base Civil Engineer

Attachment: EA Addressing the Integrated Control of Nuisance Species at Grand Forks AFB, ND  
DISTRIBUTION: Listed on next page

## DISTRIBUTION LIST

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Emerado ND 58228

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Arvilla ND 58214

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## Tear Sheet and Affidavit

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**PUBLIC NOTICE**  
U.S. Air Force  
Notice of Availability

**Draft Environmental Assessment Addressing  
Integrated Control of Nuisance Species  
at Grand Forks Air Force Base, North Dakota**

**Grand Forks Air Force Base, North Dakota - A Draft Environmental Assessment (EA) for Integrated Control of Nuisance Species at Grand Forks Air Force Base, North Dakota, is being prepared. The U.S. Air Force (USAF) proposes to implement an integrated pest management program to eradicate mosquitoes and noxious and invasive weed species at and around Grand Forks AFB to enable personnel to better perform activities and training necessary to meet the USAF mission at the installation.**

The USAF is proposing to issue a Finding of No Significant Impact (FONSI)/Finding of No Practical Alternative (FONPA) based on the Draft EA. The analysis considered in detail the potential effects of the Proposed Action and the No Action Alternative on the following resource areas: land use, air quality, geological resources, water resources, biological resources, and safety. The results of the analysis presented in the Draft EA indicate that the Proposed Action would not have a significant impact on the environment, indicating that a FONSI/FONPA would be appropriate and an Environmental Impact Statement is not considered necessary to implement the Proposed Action.

Copies of the Draft EA showing the analysis are available for review at the following libraries:

<b>Grand Forks Library East</b> 2110 Library Circle Grand Forks, ND 58201 701-772-8116	<b>Grand Forks Campbell Library</b> 422 4th Street NW East Grand Forks, MN 56721 218-773-9354	<b>Grand Forks AFB Library</b> 511 Holzapfel Street Grand Forks AFB, ND 58205 701-747-3046
---	--	---

The document is also available at the following Web site:  
<http://www.grandforks.af.mil/library>

Written comments on the Draft EA are invited and will be received for 30 days from the publication of this notice. Comments for consideration by the USAF on this document should be provided in writing to:

**Public Affairs Office  
319th Air Base Wing  
701 Eielson Street, Building 607, Room 211  
Grand Forks AFB, North Dakota 58205  
Email: PublicAffairsOfficeGrandForksAFB@us.af.mil  
Phone: 701-747-5023**

R001042726

Affidavit of Publication  
State of North Dakota  
County of Grand Forks

Jennifer Ekberg of said State and County being first duly sworn, on the oath says that she is an advertising executive of the Grand Forks Herald, Inc. publisher of the Grand Forks Herald, Morning Edition, a daily newspaper of general circulation, printed and published in the City of Grand Forks, in said County and State and has been during the time hereinafter mentioned, and that the advertisement of **Grand Forks County** was printed and published in every copy of following issue of said newspaper to wit:

ROP Ad                    01-05-2013                    HDR Announcement                    \$ 411.30

And that the full amount of the fee for publication of the annexed notice inures solely to the benefit of the publishers of said newspaper; that no agreement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any person whomsoever and the amount of said fee is \$ 411.30

That said newspaper was, at the time of the aforesaid publication, the duly elected and qualified Official Newspaper within said County, and qualified in accordance with the law of the State of North Dakota to do legal printing in said County and State

---

Subscribed and sworn to before me this \_\_\_\_\_ day of  
\_\_\_\_\_  
A.D. 2011

\_\_\_\_\_  
Notary Public, Grand Forks, ND

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**APPENDIX B**

**MATERIALS SAFETY DATA SHEETS AND LABELS**

**(REFER TO ENCLOSED CD)**

**MONSANTO COMPANY**  
Material Safety Data Sheet  
Commercial Product

---

## 1. PRODUCT AND COMPANY IDENTIFICATION

**Product name**

AquaMaster® Herbicide

**EPA Reg. No.**

524-343

**Product use**

Herbicide

**Chemical name**

Not applicable.

**Synonyms**

None.

**Company**

MONSANTO COMPANY, 800 N. Lindbergh Blvd., St. Louis, MO, 63167

**Telephone:** 800-332-3111, **Fax:** 314-694-5557

**Emergency numbers**

FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT Call CHEMTREC - Day or Night: 1-800-424-9300 toll free in the continental U.S., Puerto Rico, Canada, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted).

FOR MEDICAL EMERGENCY - Day or Night: +1 (314) 694-4000 (collect calls accepted).

---

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

**Active ingredient**

Isopropylamine salt of N-(phosphonomethyl)glycine; {Isopropylamine salt of glyphosate}

**Composition**

COMPONENT	CAS No.	% by weight (approximate)
Isopropylamine salt of glyphosate	38641-94-0	53.8
Water	7732-18-5	46.2

**OSHA Status**

This product is not hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

---

## 3. HAZARDS IDENTIFICATION

**Emergency overview**

**Appearance and odour (colour/form/odour):** Colourless - Amber / Liquid, (viscous) / Odourless

CAUTION!

**Potential health effects**

**Likely routes of exposure**

Skin contact, eye contact, inhalation

**Eye contact, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

**Skin contact, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

**Inhalation, short term**

Not expected to produce significant adverse effects when recommended use instructions are followed.

Refer to section 11 for toxicological and section 12 for environmental information.

---

## **4. FIRST AID MEASURES**

### **Eye contact**

Immediately flush with plenty of water.  
If easy to do, remove contact lenses.

### **Skin contact**

Take off contaminated clothing, wristwatch, jewellery.  
Wash affected skin with plenty of water.  
Wash clothes and clean shoes before re-use.

### **Inhalation**

Remove to fresh air.

### **Ingestion**

Immediately offer water to drink.  
Do NOT induce vomiting unless directed by medical personnel.  
If symptoms occur, get medical attention.

### **Advice to doctors**

This product is not an inhibitor of cholinesterase.

### **Antidote**

Treatment with atropine and oximes is not indicated.

---

## **5. FIRE-FIGHTING MEASURES**

### **Flash point**

none

### **Extinguishing media**

Recommended: Water, foam, dry chemical, carbon dioxide (CO<sub>2</sub>)

### **Unusual fire and explosion hazards**

None.  
Environmental precautions: see section 6.

### **Hazardous products of combustion**

Carbon monoxide (CO), phosphorus oxides (PxO<sub>y</sub>), nitrogen oxides (NO<sub>x</sub>)

### **Fire fighting equipment**

Self-contained breathing apparatus.  
Equipment should be thoroughly decontaminated after use.

---

## **6. ACCIDENTAL RELEASE MEASURES**

### **Personal precautions**

Use personal protection recommended in section 8.

### **Environmental precautions**

SMALL QUANTITIES:  
Low environmental hazard.

**LARGE QUANTITIES:**

Minimise spread.  
Keep out of drains, sewers, ditches and water ways.  
Notify authorities.

**Methods for cleaning up**

**SMALL QUANTITIES:**

Flush spill area with water.

**LARGE QUANTITIES:**

Absorb in earth, sand or absorbent material.  
Dig up heavily contaminated soil.  
Collect in containers for disposal.  
Refer to section 7 for types of containers.  
Flush residues with small quantities of water.  
Minimise use of water to prevent environmental contamination.

Refer to section 13 for disposal of spilled material.

---

## 7. HANDLING AND STORAGE

Good industrial practice in housekeeping and personal hygiene should be followed.

**Handling**

Avoid contact with skin and eyes.  
When using do not eat, drink or smoke.  
Wash hands thoroughly after handling or contact.  
Thoroughly clean equipment after use.  
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.  
Refer to section 13 for disposal of rinse water.  
Emptied containers retain vapour and product residue.

**Storage**

Minimum storage temperature: -15 °C  
Maximum storage temperature: 50 °C  
Compatible materials for storage: stainless steel, aluminium, fibreglass, plastic, glass lining  
Incompatible materials for storage: galvanised steel, unlined mild steel, see section 10.  
Keep out of reach of children.  
Keep away from food, drink and animal feed.  
Keep only in the original container.  
Partial crystallization may occur on prolonged storage below the minimum storage temperature.  
If frozen, place in warm room and shake frequently to put back into solution.  
Minimum shelf life: 5 years.

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Airborne exposure limits**

Components	Exposure Guidelines
Isopropylamine salt of glyphosate	No specific occupational exposure limit has been established.
Water	No specific occupational exposure limit has been established.

**Engineering controls**

No special requirement when used as recommended.

**Eye protection**

No special requirement when used as recommended.

**Skin protection**

No special requirement when used as recommended.

**Respiratory protection**

No special requirement when used as recommended.

When recommended, consult manufacturer of personal protective equipment for the appropriate type of equipment for a given application.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

Colour/colour range:	Colourless - Amber
Form:	Liquid, (viscous)
Odour:	Odourless
Flash point:	none
Specific gravity:	1.206 @ 20 °C / 15.6 °C
Solubility:	Water: Completely miscible.
pH:	4.6 - 4.8 @ 63 g/l
Partition coefficient (log Pow):	< 0.000 (active ingredient)

---

## 10. STABILITY AND REACTIVITY

**Stability**

Stable under normal conditions of handling and storage.

**Hazardous decomposition**

Thermal decomposition: Hazardous products of combustion: see section 5.

**Materials to avoid/Reactivity**

Reacts with galvanised steel or unlined mild steel to produce hydrogen, a highly flammable gas that could explode.

---

## 11. TOXICOLOGICAL INFORMATION

This section is intended for use by toxicologists and other health professionals.

Data obtained on product, similar products and on components are summarized below.

**Mutagenicity**

**Micronucleus test(s):**

Not mutagenic.

**Ames test(s):**

Not mutagenic with and without metabolic activation.

**Isopropylamine salt of glyphosate (62%)**

**Acute oral toxicity**

**Rat, LD50 (limit test): > 5,000 mg/kg body weight**

Practically non-toxic.

FIFRA category IV.

No mortality.

**Mouse, LD50 (limit test):** > 5,000 mg/kg body weight

Practically non-toxic.

FIFRA category IV.

No mortality.

#### **Acute dermal toxicity**

**Rabbit, LD50 (limit test):** > 5,000 mg/kg body weight

Practically non-toxic.

FIFRA category IV.

No mortality.

#### **Skin irritation**

**Rabbit, 6 animals, Draize test:**

Days to heal: 3

Primary Irritation Index (PII): 0.0/8.0

Essentially non irritating.

FIFRA category IV.

#### **Acute inhalation toxicity**

**Rat, LC50, 4 hours, aerosol:** > 4.24 mg/L

Practically non-toxic.

FIFRA category IV.

No mortality. Maximum attainable concentration.

#### **Skin sensitization**

**Guinea pig, Buehler test:**

Positive incidence: 0 %

### **N-(phosphonomethyl)glycine; {glyphosate}**

#### **Mutagenicity**

**In vitro and in vivo mutagenicity test(s):**

Not mutagenic.

#### **Repeated dose toxicity**

**Rabbit, dermal, 21 days:**

NOAEL toxicity: > 5,000 mg/kg body weight/day

Target organs/systems: none

Other effects: none

**Rat, oral, 3 months:**

NOAEL toxicity: > 20,000 mg/kg diet

Target organs/systems: none

Other effects: none

#### **Chronic effects/carcinogenicity**

**Mouse, oral, 24 months:**

NOEL tumour: > 30,000 mg/kg diet

NOAEL toxicity: ~ 5,000 mg/kg diet

Tumours: none

Target organs/systems: liver

Other effects: decrease of body weight gain, histopathologic effects

**Rat, oral, 24 months:**

NOEL tumour: > 20,000 mg/kg diet

NOAEL toxicity: ~ 8,000 mg/kg diet

Tumours: none

Target organs/systems: eyes

Other effects: decrease of body weight gain, histopathologic effects

#### **Toxicity to reproduction/fertility**

**Rat, oral, 3 generations:**

NOAEL toxicity: > 30 mg/kg body weight

NOAEL reproduction: > 30 mg/kg body weight

Target organs/systems in parents: none

Other effects in parents: none

Target organs/systems in pups: none

Other effects in pups: none

**Developmental toxicity/teratogenicity**

**Rat, oral, 6 - 19 days of gestation:**

NOAEL toxicity: 1,000 mg/kg body weight

NOAEL development: 1,000 mg/kg body weight

Other effects in mother animal: decrease of body weight gain, decrease of survival

Developmental effects: weight loss, post-implantation loss, delayed ossification

Effects on offspring only observed with maternal toxicity.

**Rabbit, oral, 6 - 27 days of gestation:**

NOAEL toxicity: 175 mg/kg body weight

NOAEL development: 175 mg/kg body weight

Target organs/systems in mother animal: none

Other effects in mother animal: decrease of survival

Developmental effects: none

---

## 12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Data obtained on components are summarized below.

**Isopropylamine salt of glyphosate (62%)**

**Aquatic toxicity, fish**

**Bluegill sunfish (*Lepomis macrochirus*):**

Acute toxicity, 96 hours, static, LC50: > 1,000 mg/L

Practically non-toxic.

**Rainbow trout (*Oncorhynchus mykiss*):**

Acute toxicity, 96 hours, static, LC50: > 1,000 mg/L

Practically non-toxic.

**Aquatic toxicity, invertebrates**

**Water flea (*Daphnia magna*):**

Acute toxicity, 48 hours, static, EC50: 930 mg/L

Practically non-toxic.

**Aquatic toxicity, algae/aquatic plants**

**Green algae (*Scenedesmus subspicatus*):**

Acute toxicity, 72 hours, static, ErC50 (growth rate): 166 mg/L

Practically non-toxic.

**Soil organism toxicity, invertebrates**

**Earthworm (*Eisenia foetida*):**

Acute toxicity, 14 days, LC50: > 5,000 mg/kg dry soil

Practically non-toxic.

**N-(phosphonomethyl)glycine; {glyphosate}**

**Avian toxicity**

**Bobwhite quail (*Colinus virginianus*):**

Dietary toxicity, 5 days, LC50: > 4,640 mg/kg diet

No more than slightly toxic.

**Mallard duck (*Anas platyrhynchos*):**

Dietary toxicity, 5 days, LC50: > 4,640 mg/kg diet

No more than slightly toxic.

**Bobwhite quail (*Colinus virginianus*):**

Acute oral toxicity, single dose, LD50: > 3,851 mg/kg body weight

Practically non-toxic.

#### Arthropod toxicity

##### **Honey bee (Apis mellifera):**

Oral, 48 hours, LD50: 100 µg/bee

##### **Honey bee (Apis mellifera):**

Contact, 48 hours, LD50: > 100 µg/bee

Practically non-toxic.

#### Bioaccumulation

##### **Bluegill sunfish (Lepomis macrochirus):**

Whole fish: BCF: < 1

No significant bioaccumulation is expected.

#### Dissipation

##### **Soil, field:**

Half life: 2 - 174 days

Koc: 884 - 60,000 L/kg

Adsorbs strongly to soil.

##### **Water, aerobic:**

Half life: < 7 days

---

## 13. DISPOSAL CONSIDERATIONS

#### **Product**

Not classified as hazardous waste by the Resource, Conservation and Recovery Act (RCRA), 40 CFR 261.

Recycle if appropriate facilities/equipment available.

Burn in special, controlled high temperature incinerator.

Keep out of drains, sewers, ditches and water ways.

Follow all local/regional/national/international regulations.

Consult your attorney or appropriate regulatory officials for information on disposal.

#### **Container**

Triple or pressure rinse empty containers.

Pour rinse water into spray tank.

Store for collection by approved waste disposal service.

Dispose of as non hazardous industrial waste.

Do NOT re-use containers.

Follow all local/regional/national/international regulations.

---

## 14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

Not hazardous under the applicable DOT, ICAO/IATA, IMO, TDG and Mexican regulations.

---

## 15. REGULATORY INFORMATION

#### **TSCA Inventory**

All components are on the US EPA's TSCA Inventory

#### **SARA Title III Rules**

##### **Section 311/312 Hazard Categories**

Not applicable.

##### **Section 302 Extremely Hazardous Substances**

Not applicable.

##### **Section 313 Toxic Chemical(s)**

Not applicable.

**CERCLA Reportable quantity**

Not applicable.

**16. OTHER INFORMATION**

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.

Follow all local/regional/national/international regulations.

Please consult supplier if further information is needed.

For more information refer to product label.

Please consult Monsanto if further information is needed.

In this document the British spelling was applied.

® Registered trademark of Monsanto Company or its subsidiaries.

	Health	Flammability	Instability	Additional Markings
NFPA	0	1	1	

0 = Minimal hazard, 1 = Slight hazard, 2 = Moderate hazard, 3 = Severe hazard, 4 = Extreme hazard

Full denotation of most frequently used acronyms. BCF (Bioconcentration Factor), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), EC50 (50% effect concentration), ED50 (50% effect dose), I.M. (intramuscular), I.P. (intraperitoneal), I.V. (intravenous), Koc (Soil adsorption coefficient), LC50 (50% lethality concentration), LD50 (50% lethality dose), LDLo (Lower limit of lethal dosage), LEL (Lower Explosion Limit), LOAEC (Lowest Observed Adverse Effect Concentration), LOAEL (Lowest Observed Adverse Effect Level), LOEC (Lowest Observed Effect Concentration), LOEL (Lowest Observed Effect Level), MEL (Maximum Exposure limit), MTD (Maximum Tolerated Dose), NOAEC (No Observed Adverse Effect Concentration), NOAEL (No Observed Adverse Effect Level), NOEC (No Observed Effect Concentration), NOEL (No Observed Effect Level), OEL (Occupational Exposure Limit), PEL (Permissible Exposure Limit), PII (Primary Irritation Index), Pow (Partition coefficient n-octanol/water), S.C. (subcutaneous), STEL (Short-Term Exposure Limit), TLV-C (Threshold Limit Value-Ceiling), TLV-TWA (Threshold Limit Value - Time Weighted Average), UEL (Upper Explosion Limit)

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course. Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-approved label.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, MONSANTO Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for the purposes prior to use. In no event will MONSANTO Company be responsible for damages of any nature whatsoever resulting from the use of or reliance upon information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR TO THE PRODUCT TO WHICH INFORMATION REFERS.

# MATERIAL SAFETY DATA SHEET



## RODEO\* HERBICIDE

Emergency Phone: 800-992-5994  
Dow AgroSciences LLC  
Indianapolis, IN 46268

Effective Date: 3/23/04  
Product Code: 84825  
MSDS: 006694

### 1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Rodeo\* Herbicide

#### COMPANY IDENTIFICATION:

Dow AgroSciences LLC  
9330 Zionsville Road  
Indianapolis, IN 46268-1189

### 2. COMPOSITION/INFORMATION ON INGREDIENTS:

Glyphosate IPA:	CAS # 038641-94-0	53.8%
N-(phosphono-methyl) glycine, Isopropylamine		
Salt		
Balance, Total		46.2%

### 3. HAZARDOUS IDENTIFICATIONS:

#### EMERGENCY OVERVIEW

Clear, pale yellow liquid. May cause eye irritation. Slightly toxic to aquatic organisms.

EMERGENCY PHONE NUMBER: 800-992-5994

### 4. FIRST AID:

EYE: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Remove person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

### 5. FIRE FIGHTING MEASURES:

FLASH POINT: >214°F (>101°C)

METHOD USED: Setaflash

#### FLAMMABLE LIMITS:

LFL: Not applicable

UFL: Not applicable

EXTINGUISHING MEDIA: Foam, CO<sub>2</sub>, Dry Chemical

FIRE AND EXPLOSION HAZARDS: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus and full protective equipment.

### 6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS: Absorb small spills with an inert absorbent material such as Hazorb, Zorball, sand, or dirt. Report large spills to Dow AgroSciences on 800-992-5994.

### 7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed. Store above 10°F (-12°C) to keep from crystallizing.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINES: None established

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

#### RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

# MATERIAL SAFETY DATA SHEET



## RODEO\* HERBICIDE

**RESPIRATORY PROTECTION:** For most conditions, no respiratory protection should be needed; however, if discomfort is experienced, use a NIOSH approved air-purifying respirator.

**APPLICATIONS AND ALL OTHER HANDLERS:** Please refer to the product label for personal protective clothing and equipment.

### 9. PHYSICAL AND CHEMICAL PROPERTIES:

**APPEARANCE:** Clear, pale yellow liquid

**DENSITY:** 10.0 - 10.5 lbs/gal

**pH:** 4.8 – 5.0

**ODOR:** None

**SOLUBILITY IN WATER:** Miscible

**SPECIFIC GRAVITY:** 1.21 gm/L

**FREEZING POINT:** -7°F - -10°F (-21°C - -25°C)

### 10. STABILITY AND REACTIVITY:

**STABILITY:** (CONDITIONS TO AVOID) Stable under normal storage conditions.

**INCOMPATIBILITY:** (SPECIFIC MATERIALS TO AVOID) Galvanized or unlined steel (except stainless steel) containers or spray tanks may produce hydrogen gas which may form a highly combustible gas mixture.

**HAZARDOUS DECOMPOSITION PRODUCTS:** None known.

**HAZARDOUS POLYMERIZATION:** Not known to occur.

### 11. TOXICOLOGICAL INFORMATION:

**EYE:** May cause slight temporary eye irritation. Corneal injury is unlikely.

**SKIN:** Essentially non-irritating to skin. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD<sub>50</sub> for skin absorption in rabbits is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

**INGESTION:** Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD<sub>50</sub> for rats is >5000 mg/kg.

**INHALATION:** Brief exposure (minutes) is not likely to cause adverse effects. The aerosol LC<sub>50</sub> for rats is >6.37 mg/L for 4 hours.

Emergency Phone: 800-992-5994  
Dow AgroSciences LLC  
Indianapolis, IN 46268

Effective Date: 3/23/04  
Product Code: 84825  
MSDS: 006694

**SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:** For a similar material, glyphosate, in animals, effects have been reported on the following organ: liver.

**CANCER INFORMATION:** A similar material, glyphosate, did not cause cancer in laboratory animals.

**TERATOLOGY (BIRTH DEFECTS):** For glyphosate IPA, available data are inadequate for evaluation of potential to cause birth defects.

**REPRODUCTIVE EFFECTS:** For glyphosate IPA, available data are inadequate to determine effects on reproduction.

**MUTAGENICITY:** For a similar material, glyphosate, in-vitro and animal genetic toxicity studies were negative.

### 12. ECOLOGICAL INFORMATION:

#### ENVIRONMENTAL DATA:

#### ECOTOXICOLOGY:

Material is practically non-toxic to aquatic organisms on an acute basis (LC<sub>50</sub> or EC<sub>50</sub> is >100 mg/L in most sensitive species tested).

Acute LC<sub>50</sub> for rainbow trout (*Oncorhynchus mykiss*) is >2500 mg/L.

Acute immobilization EC<sub>50</sub> in water flea (*Daphnia magna*) is 918 mg/L.

Material is practically non-toxic to birds on an acute basis (LD<sub>50</sub> is >2000 mg/kg).

Acute oral LD<sub>50</sub> in bobwhite (*Colinus virginianus*) is >2000 mg/kg.

The LC<sub>50</sub> in earthworm *Eisenia foetida* is >1000 mg/kg.

Acute contact LD<sub>50</sub> in honey bee (*Apis mellifera*) is >100 µg/bee.

Acute oral LD<sub>50</sub> in honey bee (*Apis mellifera*) is >100 µg/bee.

Growth inhibition EC<sub>50</sub> in green alga (*Selenastrum capricornutum*) is 127 mg/L.

Growth inhibition EC<sub>50</sub> in duckweed (*Lemna sp.*) is 24.4 mg/L.

### 13. DISPOSAL CONSIDERATIONS:

**DISPOSAL METHOD:** If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

# MATERIAL SAFETY DATA SHEET



## RODEO\* HERBICIDE

Emergency Phone: 800-992-5994  
Dow AgroSciences LLC  
Indianapolis, IN 46268

Effective Date: 3/23/04  
Product Code: 84825  
MSDS: 006694

This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

### 14. TRANSPORT INFORMATION:

#### U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For all package sizes and modes of transportation:  
This material is not regulated for transport.

### 15. REGULATORY INFORMATION:

**NOTICE:** The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

#### U.S. REGULATIONS

**SARA 313 INFORMATION:** To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

**SARA HAZARD CATEGORY:** This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

**TOXIC SUBSTANCES CONTROL ACT (TSCA):** All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

**STATE RIGHT-TO-KNOW:** This product is not known to contain any substances subject to the disclosure requirements of

New Jersey  
Pennsylvania

**OSHA HAZARD COMMUNICATION STANDARD:** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):** To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

#### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

CATEGORY	RATING
Health	1
Flammability	1
Reactivity	0

### 16. OTHER INFORMATION:

**MSDS STATUS:** Revised Sections: 3,4,11,12,13,14 & 15  
Reference: DR-0361-8028  
Replaces MSDS Dated: 1/12/00  
Document Code: D03-148-002  
Replaces Document Code: D03-148-001

The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult Dow AgroSciences For Further Information.



The Chemical Company

## Safety Data Sheet ARSENAL POWERLINE HERBICIDE

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### 1. Product and Company Identification

Company  
BASF CORPORATION  
100 Campus Drive  
Florham Park, NJ 07932, USA

24 Hour Emergency Response Information  
CHEMTREC: 1-800-424-9300  
BASF HOTLINE: 1-800-832-HELP

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Substance number: 000000234359  
Molecular formula: C(13) H(15) N(3) O(3). C(3) H(9) N  
Chemical family: imidazole derivative  
Synonyms: Isopropylamine salt of imazapyr

---

### 2. Hazards Identification

#### Emergency overview

##### CAUTION:

May cause moderate but temporary irritation to the eyes.  
Prolonged or repeated skin contact may cause sensitization or allergic reactions.  
HARMFUL IF SWALLOWED.  
KEEP OUT OF REACH OF CHILDREN.  
KEEP OUT OF REACH OF DOMESTIC ANIMALS.  
Avoid contact with the skin, eyes and clothing.  
Avoid inhalation of mists/vapours.

See Product Label for additional precautionary statements.

State of matter: liquid  
Colour: transparent  
Colour: light yellow  
Odour: odourless

#### Potential health effects

##### Primary routes of exposure:

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

##### Acute toxicity:

Slightly toxic after single ingestion. Relatively nontoxic after short-term skin contact. Relatively nontoxic after short-term inhalation.

##### Irritation / corrosion:

May cause slight but temporary irritation to the eyes. May cause slight irritation to the skin.

##### Sensitization:

Caused skin sensitization in animal studies.

# Safety Data Sheet

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### Medical conditions aggravated by overexposure:

Individuals with pre-existing diseases of the respiratory system, skin or eyes may have increased susceptibility to excessive exposures.

### Potential environmental effects

#### Aquatic toxicity:

There is a high probability that the product is not acutely harmful to fish. There is a high probability that the product is not acutely harmful to aquatic invertebrates. Acutely harmful for aquatic plants.

#### Terrestrial toxicity:

With high probability not acutely harmful to terrestrial organisms.

## 3. Composition / Information on Ingredients

CAS Number	Content (W/W)	Chemical name
81510-83-0	26.7 %	imazapyr isopropylamine salt
	73.3 %	Proprietary ingredients

## 4. First-Aid Measures

#### General advice:

First aid providers should wear personal protective equipment to prevent exposure. Remove contaminated clothing. Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or physician for treatment advice. Have the product container or label with you when calling a poison control center or doctor or going for treatment.

#### If inhaled:

Remove the affected individual into fresh air and keep the person calm.

#### If on skin:

Rinse skin immediately with plenty of water for 15 - 20 minutes.

#### If in eyes:

Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing.

#### If swallowed:

Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

#### Note to physician

Antidote: No known specific antidote.  
Treatment: Treat symptomatically.

## 5. Fire-Fighting Measures

Flash point:

Based on the high water content the determination of the flash point seems not to be necessary.

Autoignition:

Based on the water content the product does not ignite.

Suitable extinguishing media:

foam, dry extinguishing media, carbon dioxide, water spray

# Safety Data Sheet

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### Hazards during fire-fighting:

carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Hydrocarbons, If product is heated above decomposition temperature, toxic vapours will be released. The substances/groups of substances mentioned can be released if the product is involved in a fire.

### Protective equipment for fire-fighting:

Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

### Further information:

Evacuate area of all unnecessary personnel. Contain contaminated water/firefighting water. Do not allow to enter drains or waterways.

---

## 6. Accidental release measures

### Personal precautions:

Take appropriate protective measures. Clear area. Shut off source of leak only under safe conditions. Extinguish sources of ignition nearby and downwind. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

### Environmental precautions:

Do not discharge into the subsoil/soil. Do not discharge into drains/surface waters/groundwater. Contain contaminated water/firefighting water.

### Cleanup:

Dike spillage. Pick up with suitable absorbent material. Place into suitable containers for reuse or disposal in a licensed facility. Spilled substance/product should be recovered and applied according to label rates whenever possible. If application of spilled substance/product is not possible, then spills should be contained, solidified, and placed in suitable containers for disposal. After decontamination, spill area can be washed with water. Collect wash water for approved disposal.

---

## 7. Handling and Storage

### Handling

#### General advice:

RECOMMENDATIONS ARE FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS. PESTICIDE APPLICATORS & WORKERS must refer to the Product Label and Directions for Use attached to the product for Agricultural Use Requirements in accordance with the EPA Worker Protection Standard 40 CFR part 170. Ensure adequate ventilation. Provide good ventilation of working area (local exhaust ventilation if necessary). Keep away from sources of ignition - No smoking. Keep container tightly sealed. Protect contents from the effects of light. Protect against heat. Protect from air. Handle and open container with care. Do not open until ready to use. Once container is opened, content should be used as soon as possible. Avoid aerosol formation. Avoid dust formation. Provide means for controlling leaks and spills. Do not return residues to the storage containers. Follow label warnings even after container is emptied. The substance/product may be handled only by appropriately trained personnel. Avoid all direct contact with the substance/product. Avoid contact with the skin, eyes and clothing. Avoid inhalation of dusts/mists/vapours. Wear suitable personal protective clothing and equipment.

#### Protection against fire and explosion:

The relevant fire protection measures should be noted. Fire extinguishers should be kept handy. Avoid all sources of ignition: heat, sparks, open flame. Sources of ignition should be kept well clear. Avoid extreme heat. Keep away from oxidizable substances. Electrical equipment should conform to national electric code. Ground all transfer equipment properly to prevent electrostatic discharge. Electrostatic discharge may cause ignition.

### Storage

#### General advice:

Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect containers from physical damage. Protect against contamination. The authority permits and storage regulations must be observed.

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### Storage incompatibility:

General advice: Segregate from incompatible substances. Segregate from foods and animal feeds. Segregate from textiles and similar materials.

### Temperature tolerance

Protect from temperatures below: 0 °C

Changes in the properties of the product may occur if substance/product is stored below indicated temperature for extended periods of time.

Protect from temperatures above: 40 °C

Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

## 8. Exposure Controls and Personal Protection

**Users of a pesticidal product should refer to the product label for personal protective equipment requirements.**

### Advice on system design:

Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

### Personal protective equipment

#### RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

##### **Respiratory protection:**

Wear respiratory protection if ventilation is inadequate. Wear a NIOSH-certified (or equivalent) TC23C Chemical/Mechanical type filter system to remove a combination of particles, gas and vapours. For situations where the airborne concentrations may exceed the level for which an air purifying respirator is effective, or where the levels are unknown or Immediately Dangerous to Life or Health (IDLH), use NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

##### **Hand protection:**

Chemical resistant protective gloves, Protective glove selection must be based on the user's assessment of the workplace hazards.

##### **Eye protection:**

Safety glasses with side-shields. Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

##### **Body protection:**

Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

##### **General safety and hygiene measures:**

Wear long sleeved work shirt and long work pants in addition to other stated personal protective equipment. Work place should be equipped with a shower and an eye wash. Handle in accordance with good industrial hygiene and safety practice. Personal protective equipment should be decontaminated prior to reuse. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Store work clothing separately. Hands and/or face should be washed before breaks and at the end of the shift. No eating, drinking, smoking or tobacco use at the place of work. Keep away from food, drink and animal feeding stuffs.

## 9. Physical and Chemical Properties

Form:	liquid
Odour:	odourless
Colour:	transparent

# Safety Data Sheet

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pH value:	light yellow	
Freezing point:	6.8	( 25 °C)
Boiling point:	approx. 0 °C	( 1,013.3 hPa) Information applies to the solvent.
Vapour pressure:	approx. 100 °C	( 1,013.3 hPa) Information applies to the solvent.
Density:	approx. 23.3 hPa	( 20 °C) Information applies to the solvent.
Relative density:	1.10 g/cm3	( 20 °C)
Bulk density:	1.10	( 20 °C)
Viscosity, dynamic:	not applicable	
Solubility in water:	163.2 mPa.s	( 20 °C)
Molar mass:	56.59 mPa.s	( 40 °C)
		miscible

## 10. Stability and Reactivity

**Conditions to avoid:**

Avoid all sources of ignition: heat, sparks, open flame. Avoid extreme temperatures. Avoid prolonged exposure to extreme heat. Avoid contamination. Avoid electro-static discharge. Avoid prolonged storage.

**Substances to avoid:**

oxidizing agents, reducing agents

**Hazardous reactions:**

The product is chemically stable.

**Decomposition products:**

No hazardous decomposition products if stored and handled as prescribed/indicated., Prolonged thermal loading can result in products of degradation being given off.

**Thermal decomposition:**

Possible thermal decomposition products:  
carbon monoxide, carbon dioxide, nitrogen oxide, nitrogen dioxide, Hydrocarbons  
Stable at ambient temperature. If product is heated above decomposition temperature toxic vapours may be released.

**Corrosion to metals:**

Corrosive effect on: mild steel brass

**Oxidizing properties:**

Not an oxidizer.

## 11. Toxicological information

**Acute toxicity****Oral:**

Type of value: LD50  
Species: rat (male/female)  
Value: > 2,000 mg/kg

**Inhalation:**

Type of value: LC50  
Species: rat  
Value: > 5.5 mg/l  
Exposition time: 4 h

**Dermal:**

Type of value: LD50

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## ARSENAL POWERLINE HERBICIDE

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Species: rabbit (male/female)  
Value: > 5,000 mg/kg

### Irritation / corrosion

#### **Skin:**

Species: rabbit  
Result: non-irritant  
Method: Primary skin irritation test

#### **Eye:**

Species: rabbit  
Result: non-irritant

#### **Sensitization:**

Skin sensitization test  
Species: guinea pig  
Result: Caused skin sensitization in animal studies.

### Genetic toxicity

#### *Information on: imazapyr*

No mutagenic effect was found in various tests with microorganisms and mammals.

### Carcinogenicity

#### *Information on: imazapyr*

In long-term studies in rats and mice in which the substance was given by feed, a carcinogenic effect was not observed.

### Reproductive toxicity

#### *Information on: imazapyr*

The results of animal studies gave no indication of a fertility impairing effect.

### Development:

#### *Information on: imazapyr*

No indications of a developmental toxic / teratogenic effect were seen in animal studies.

---

## 12. Ecological Information

### Fish

#### *Information on: imazapyr*

Acute:  
*Oncorhynchus mykiss/LC50 (96 h): > 100 mg/l*

### Aquatic invertebrates

#### *Information on: imazapyr*

Acute:  
*Daphnia magna/EC50 (48 h): > 100 mg/l*

### Aquatic plants

# Safety Data Sheet

## ARSENAL POWERLINE HERBICIDE

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*Information on: imazapyr*  
*Toxicity to aquatic plants:*  
*green algae/EC50: 71 mg/l*

### Non-Mammals

*Information on: imazapyr*  
*Other terrestrial non-mammals:*  
*mallard duck/LC50: > 5,000 ppm*  
*With high probability not acutely harmful to terrestrial organisms.*  
*Honey bee/LD50: > 100 ug/bee*  
*With high probability not acutely harmful to terrestrial organisms.*

### Degradability / Persistence

#### Biological / Abiological Degradation

Evaluation: Not readily biodegradable (by OECD criteria).

#### Other adverse effects:

The ecological data given are those of the active ingredient. Do not release untreated into natural waters.

---

## 13. Disposal considerations

#### Waste disposal of substance:

Pesticide wastes are regulated. Improper disposal of excess pesticide, spray mix or rinsate is a violation of federal law. If pesticide wastes cannot be disposed of according to label instructions, contact the State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

#### Container disposal:

Rinse thoroughly at least three times (triple rinse) in accordance with EPA recommendations. Consult state or local disposal authorities for approved alternative procedures such as container recycling. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

#### RCRA:

This product is not regulated by RCRA.

---

## 14. Transport Information

Reference Bill of Lading

---

## 15. Regulatory Information

#### Federal Regulations

##### Registration status:

Chemical TSCA, US blocked / not listed

Crop Protection TSCA, US released / exempt

OSHA hazard category: Chronic target organ effects reported; ACGIH TLV established

EPCRA 311/312 (Hazard categories): Acute; Chronic

# Safety Data Sheet

## ARSENAL POWERLINE HERBICIDE

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### State regulations

#### **CA Prop. 65:**

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

---

## 16. Other Information

### **Refer to product label for EPA registration number.**

Recommended use: herbicide

BASF supports worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

---

### **Local Contact Information**

Product Stewardship  
919 547-2000

IMPORTANT: WHILE THE DESCRIPTIONS, DESIGNS, DATA AND INFORMATION CONTAINED HEREIN ARE PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE, IT IS PROVIDED FOR YOUR GUIDANCE ONLY. BECAUSE MANY FACTORS MAY AFFECT PROCESSING OR APPLICATION/USE, WE RECOMMEND THAT YOU MAKE TESTS TO DETERMINE THE SUITABILITY OF A PRODUCT FOR YOUR PARTICULAR PURPOSE PRIOR TO USE. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING PRODUCTS DESCRIBED OR DESIGNS, DATA OR INFORMATION SET FORTH, OR THAT THE PRODUCTS, DESIGNS, DATA OR INFORMATION MAY BE USED WITHOUT INFRINGING THE INTELLECTUAL PROPERTY RIGHTS OF OTHERS. IN NO CASE SHALL THE DESCRIPTIONS, INFORMATION, DATA OR DESIGNS PROVIDED BE CONSIDERED A PART OF OUR TERMS AND CONDITIONS OF SALE. FURTHER, YOU EXPRESSLY UNDERSTAND AND AGREE THAT THE DESCRIPTIONS, DESIGNS, DATA, AND INFORMATION FURNISHED BY BASF HEREUNDER ARE GIVEN GRATIS AND BASF ASSUMES NO OBLIGATION OR LIABILITY FOR THE DESCRIPTION, DESIGNS, DATA AND INFORMATION GIVEN OR RESULTS OBTAINED, ALL SUCH BEING GIVEN AND ACCEPTED AT YOUR RISK.

END OF DATA SHEET

# MATERIAL SAFETY DATA SHEET



## MILESTONE\* VM HERBICIDE

Emergency Phone: 800-992-5994  
Dow AgroSciences LLC  
Indianapolis, IN 46268

Effective Date: 20-Apr-06  
Product Code: 103339  
MSDS: 007887

### 1. PRODUCT AND COMPANY IDENTIFICATION:

**PRODUCT:** Milestone\* VM Herbicide

#### COMPANY IDENTIFICATION:

Dow AgroSciences LLC  
9330 Zionsville Road  
Indianapolis, IN 46268-1189

### 2. HAZARDOUS IDENTIFICATIONS:

#### EMERGENCY OVERVIEW

Brown liquid with a mild odor. May cause temporary eye irritation. May cause skin irritation.

**EMERGENCY PHONE NUMBER:** 800-992-5994

### 3. COMPOSITION/INFORMATION ON INGREDIENTS:

Aminopyralid tri-isopropanolammonium	CAS # 566191-89-7	40.6%
Balance, Total, Including		59.4%

### 4. FIRST AID:

**EYE:** Flush eyes thoroughly with water for several minutes. Remove contact lenses, if present, after the initial 1-2 minutes. If effects occur, consult a physician, preferably an ophthalmologist.

**SKIN:** Wash skin with plenty of water.

**INGESTION:** No emergency medical treatment necessary.

**INHALATION:** Move person to fresh air; if effects occur, consult a physician.

**NOTE TO PHYSICIAN:** No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

### 5. FIRE FIGHTING MEASURES:

**FLASH POINT:** Not applicable (water-based material)

**METHOD USED:** Not applicable

#### FLAMMABLE LIMITS

LFL: Not determined

UFL: Not determined

**EXTINGUISHING MEDIA:** Foam, CO<sub>2</sub>, or Dry chemical

**FIRE AND EXPLOSION HAZARDS:** Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

**FIRE-FIGHTING EQUIPMENT:** Use positive-pressure, self-contained breathing apparatus and full protective equipment.

### 6. ACCIDENTAL RELEASE MEASURES:

**ACTION TO TAKE FOR SPILLS:** Absorb small spills with materials such as sand, sawdust, Zorbball, or dirt. Wash exposed body areas thoroughly after handling. Report large spills to Dow AgroSciences at 800-992-5994.

### 7. HANDLING AND STORAGE:

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

**EXPOSURE GUIDELINES:** None established

**ENGINEERING CONTROLS:** Good general ventilation should be sufficient for most conditions.

#### RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

**EYE/FACE PROTECTION:** Use safety glasses.

**SKIN PROTECTION:** Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full-body suit will depend on the task.

# MATERIAL SAFETY DATA SHEET



## MILESTONE\* VM HERBICIDE

Emergency Phone: 800-992-5994

Dow AgroSciences LLC

Indianapolis, IN 46268

Effective Date: 20-Apr-06

Product Code: 103339

MSDS: 007887

**HAND PROTECTION:** Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Polyethylene, Chlorinated polyethylene, and Ethyl vinyl alcohol laminate (EVAL). Examples of acceptable glove barrier materials include: Viton, Butyl rubber, Neoprene, Natural rubber (Latex), Polyvinyl chloride (PVC or Vinyl), Nitrile/butadiene rubber (Nitrile or NBR). Avoid gloves made of: Polyvinyl alcohol (PVA). **NOTICE:** The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

**RESPIRATORY PROTECTION:** No respiratory protection should be needed.

**APPLICATORS AND ALL OTHER HANDLERS:** Refer to the product label for personal protective clothing and equipment.

### 9. PHYSICAL AND CHEMICAL PROPERTIES:

**APPEARANCE:** Brown liquid

**ODOR:** Mild

**DENSITY:** 1.14 g/mL @ 20°C

**pH:** 7.33 @ 19.8°C for a 1% solution

**FREEZING POINT:** <14°F (<-10°C)

### 10. STABILITY AND REACTIVITY:

**STABILITY:** (CONDITIONS TO AVOID) Stable under normal storage conditions.

**INCOMPATIBILITY:** (SPECIFIC MATERIALS TO AVOID)  
None known.

**HAZARDOUS DECOMPOSITION PRODUCTS:** None known.

**HAZARDOUS POLYMERIZATION:** Not known to occur.

### 11. TOXICOLOGICAL INFORMATION:

**EYE:** May cause slight temporary eye irritation. Corneal injury is unlikely.

**SKIN:** Brief contact may cause slight skin irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD<sub>50</sub> for skin absorption in rats is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

**INGESTION:** Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD<sub>50</sub> for rats is >5000 mg/kg.

**INHALATION:** Prolonged exposure is not expected to cause adverse effects. The aerosol LC<sub>50</sub> for rats is >5.79 mg/L in 4 hours.

**SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:** Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

**CANCER INFORMATION:** Based largely or completely on information for similar material(s): did not cause cancer in laboratory animals.

**TERATOLOGY (BIRTH DEFECTS):** Did not cause birth defects or any other fetal effects in laboratory animals.

**REPRODUCTIVE EFFECTS:** Based largely or completely on information for similar material(s): did not interfere with reproduction in laboratory animal studies.

**MUTAGENICITY:** In-vitro and animal genetic toxicity studies were negative.

### 12. ECOLOGICAL INFORMATION:

#### ENVIRONMENTAL FATE:

#### MOVEMENT & PARTITIONING:

No relevant information found.

#### DEGRADATION & PERSISTENCE:

No relevant information found.

#### ECOTOXICOLOGY:

Material is practically non-toxic to aquatic organisms on an acute basis (LC<sub>50</sub> or EC<sub>50</sub> is >100 mg/L).

Material is practically non-toxic to fish on an acute basis (LC<sub>50</sub> is >100 mg/L).

Material is practically non-toxic to birds on an acute basis (LD<sub>50</sub> is >2000 mg/kg).

# MATERIAL SAFETY DATA SHEET



## MILESTONE\* VM HERBICIDE

Emergency Phone: 800-992-5994  
Dow AgroSciences LLC  
Indianapolis, IN 46268

Effective Date: 20-Apr-06  
Product Code: 103339  
MSDS: 007887

### 13. DISPOSAL CONSIDERATIONS:

**DISPOSAL METHOD:** If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

### 14. TRANSPORT INFORMATION:

#### U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For all package sizes and modes of transportation:  
This material is not regulated for transport

### 15. REGULATORY INFORMATION:

**NOTICE:** The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

#### U.S. REGULATIONS

**SARA 313 INFORMATION:** To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

**SARA HAZARD CATEGORY:** This product has been reviewed according to the EPA "Hazard Categories" promulgated under Section 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

No real health hazard

**TOXIC SUBSTANCES CONTROL ACT (TSCA):** All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

**OSHA HAZARD COMMUNICATION STANDARD:** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**STATE RIGHT-TO-KNOW:** This product is not known to contain any substances subject to the disclosure requirements of

New Jersey  
Pennsylvania

**COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):** To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

#### NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	1
Flammability	0
Reactivity	0

### 16. OTHER INFORMATION:

**MSDS STATUS:** Revised Sections: 2, 4, 8, 11, 12 & 15  
Reference: DR-0368-4864  
Replaces RSSDS Dated: 3-Jan-06  
Document Code: D03-880-004  
Replaces Document Code: D03-880-003

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.



## MATERIAL SAFETY DATA SHEET

Syngenta Crop Protection, Inc.  
Post Office Box 18300  
Greensboro, NC 27419

In Case of Emergency, Call  
**1-800-888-8372**

### 1. PRODUCT IDENTIFICATION

Product Name: **REWARD LANDSCAPE AND AQUATIC HERBICIDE** Product No.: A12872A

EPA Signal Word: Warning

Active Ingredient(%): Diquat dibromide (37.3%) CAS No.: 85-00-7

Chemical Name: [6,7-dihydrodipyrido(1,2-a:2',1'-c)pyrazinediium dibromide]

Chemical Class: Bipyridilium (dipyridilium) contact herbicide

EPA Registration Number(s): 100-1091 (formerly 10182-404)

Section(s) Revised: All sections

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Material	OSHA PEL	ACGIH TLV	Other	NTP/IARC/OSHA Carcinogen
Diquat dibromide (37.3%)	Not Established	0.5 mg/m <sup>3</sup> TWA (total dust); 0.08 mg/m <sup>3</sup> TWA (respirable dust)	0.5 mg/m <sup>3</sup> TWA**	No

\*\* recommended by NIOSH

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.

### 3. HAZARDS IDENTIFICATION

#### Symptoms of Acute Exposure

Harmful if inhaled or swallowed. Dust, mist or vapor irritating to eyes and respiratory tract. May cause skin irritation.

#### Hazardous Decomposition Products

Can decompose at high temperatures forming toxic gases.

Flammable hydrogen gas may be formed on contact with aluminum. See "Conditions to Avoid", Section 10.

#### Physical Properties

Appearance: Dark brown liquid

Odor: Odorless

#### Unusual Fire, Explosion and Reactivity Hazards

This product may form flammable and explosive hydrogen gas when in contact with aluminum.

### 4. FIRST AID MEASURES

Have the product container, label or Material Safety Data Sheet with you when calling Syngenta (800-888-8372), a poison control center or doctor, or going for treatment.

Ingestion: If swallowed: Call Syngenta (800-888-8372), a poison control center or doctor immediately for treatment advice. Have the person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so after calling 800-888-8372 or by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

- Eye Contact: If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.
- Skin Contact: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call Syngenta (800-888-8372), a poison control center or doctor for treatment advice.
- Inhalation: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call Syngenta (800-888-8372), a poison control center or doctor for further treatment advice.

#### Notes to Physician

There is no specific antidote if this product is ingested.

Treat symptomatically.

#### Medical Condition Likely to be Aggravated by Exposure

None known.

## **5. FIRE FIGHTING MEASURES**

#### Fire and Explosion

Flash Point (Test Method):	Not Applicable	
Flammable Limits (% in Air):	Lower: % Not Applicable	Upper: % Not Applicable
Autoignition Temperature:	Not Applicable	
Flammability:	Not Applicable	

#### Unusual Fire, Explosion and Reactivity Hazards

This product may form flammable and explosive hydrogen gas when in contact with aluminum.

#### In Case of Fire

Use dry chemical, foam or CO<sub>2</sub> extinguishing media. Wear full protective clothing and self-contained breathing apparatus. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. If water is used to fight fire, dike and collect runoff.

## **6. ACCIDENTAL RELEASE MEASURES**

#### In Case of Spill or Leak

Control the spill at its source. Contain the spill to prevent it from spreading, contaminating soil, or entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Section 8. If a solid, sweep up material and place in a compatible disposal container. If a liquid, cover entire spill with absorbing material and place into compatible disposal container. Scrub area with hard water detergent (e.g. commercial products such as Tide, Joy, Spic and Span). Pick up wash liquid with additional absorbent and place into compatible disposal container. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition.

## **7. HANDLING AND STORAGE**

This product reacts with aluminum to produce flammable hydrogen gas. Do not mix or store in containers or systems made of aluminum or having aluminum fittings.

Store the material in a well-ventilated, secure area out of reach of children and domestic animals. Do not store food, beverages or tobacco products in the storage area. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION ARE INTENDED FOR THE MANUFACTURE, FORMULATION AND PACKAGING OF THE PRODUCT.**

**FOR COMMERCIAL APPLICATIONS AND ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.**

Ingestion: Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

- Eye Contact:** Where eye contact is likely, use chemical splash goggles. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Skin Contact:** Where contact is likely, wear chemical-resistant (such as nitrile or butyl) gloves, coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.
- Inhalation:** Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below exposure limits. A NIOSH-certified combination air-purifying respirator with an N, P or R 95 or HE class filter and an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a pressure demand atmosphere-supplying respirator if there is any potential for uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Dark brown liquid  
 Odor: Odorless  
 Melting Point: Not Available  
 Boiling Point: Not Available  
 Specific Gravity/Density: 1.20 g/mL @ 68°F (20°C)  
 pH: 4-6

### Solubility in H<sub>2</sub>O

Diquat dibromide: 718,000 mg/L @ 68°F (20°C) and pH 7.2

### Vapor Pressure

Diquat dibromide: <10(-8) mmHg @ 77°F (25°C)

## 10. STABILITY AND REACTIVITY

- Stability: Stable under normal use and storage conditions.
- Hazardous Polymerization: Will not occur.
- Conditions to Avoid: Concentrate should not be stored in aluminum containers. Spray solutions should not be mixed, stored or applied in containers other than plastic, plastic-lined steel, stainless steel or fiberglass.
- Materials to Avoid: Strong alkalis and anionic wetting agents (e.g., alkyl and alkylaryl sulfonates). Corrosive to aluminum.
- Hazardous Decomposition Products: Can decompose at high temperatures forming toxic gases. Flammable hydrogen gas may be formed on contact with aluminum. See "Conditions to Avoid", Section 10.

## 11. TOXICOLOGICAL INFORMATION

### Acute Toxicity/Irritation Studies (Finished Product)

Ingestion:	<u>Slightly Toxic</u>
	Oral (LD50 Rat) : = 600 mg/kg body weight
Dermal:	<u>Moderately Toxic</u>
	Dermal (LD50 Rabbit) : = 260 mg/kg body weight
Inhalation:	<u>Moderately Toxic</u>
	Inhalation (LC50 Rat) : = 0.121 mg/l air - 4 hours
Eye Contact:	Irritant
Skin Contact:	Not Available
Skin Sensitization:	Not Available

### Neurotoxicity

Diquat dibromide: No evidence for neurotoxic effects in rats dosed up to 400 ppm ion in the diet for 13 weeks.

### Reproductive Effects

Diquat dibromide: Mutagenicity: No evidence in in vivo assays.

**Development Toxicity:** In rabbit studies a small percentage of fetuses had minor defects at 3 and 10 mg ion/kg/d.

#### Chronic/Subchronic Toxicity Studies

Diquat dibromide: Kidney weight decreases and cataracts seen in dogs at 12.5 mg ion/kg/d.

#### Carcinogenicity

Diquat dibromide: No evidence of carcinogenicity in rat and mouse studies.

#### Other Toxicity Information

None.

#### Toxicity of Other Components

Not Applicable

#### Target Organs

##### Active Ingredients

Diquat dibromide: Eye, kidney

##### Inert Ingredients

: Not Applicable

## **12. ECOLOGICAL INFORMATION**

#### Summary of Effects

Diquat dibromide:

This material is toxic to fish and wildlife.

#### Eco-Acute Toxicity

Diquat dibromide: Rainbow Trout 96-hour LC50 21 mg/L

Mirror Carp 96 hours LC50 67 mg/L

#### Eco-Chronic Toxicity

Diquat dibromide: Not Available

#### Environmental Fate

Diquat dibromide:

No data available for the formulation. The information presented here is for the active ingredient, diquat debromide.

Sorption: Extremely tightly adsorbed to (negatively-charged) soil particles due to its dicationic nature. Diquat is primarily adsorbed to clay, less so to OM. Diquat bound to soil is unavailable for plant uptake and is largely unavailable to soil microbes.

Koc: Average is 1,000,000 mL/g (estimated).

Photodegradation: Losses probably occur on sprayed leaf surfaces and on dead and decaying vegetation.

Photochemical decomposition of diquat has been measured in the lab by irradiating thin layers of soil, but has not been unequivocally demonstrated under field conditions.

Other degradation: Certain microbe species in soil-less culture media decompose diquat. However, they degrade diquat bound to soil slowly or not at all.

Persistence: Typical half-life is 1000 d. Diquat is highly persistent due to strong binding to clay and unavailability to microbes. Diquat in soil is not taken up by plants, so any crop can be seeded at any time after application.

Mobility: Immobile in soil.

Volatilization: No losses.

## **13. DISPOSAL CONSIDERATIONS**

#### Disposal

Do not reuse product containers. Dispose of product containers, waste containers, and residues according to local, state, and federal health and environmental regulations.

Characteristic Waste: Not Applicable

Listed Waste: Not Applicable

## **14. TRANSPORT INFORMATION**

## DOT Classification

Corrosive Liquid, N.O.S. (diquat dibromide, 37.3%), 8, UN1760, PGIII

## B/L Freight Classification

## Herbicides, NOIBN

### Comments

## International Transportation

Corrosive Liquid, N.O.S. (diquat dibromide, 37.3%), Class 8, UN1760, PGIII

## **15. REGULATORY INFORMATION**

## EPCRA SARA Title III Classification

Section 313 Toxic Chemicals: Not Applicable

## California Proposition 65

None

## CERCLA/SARA 302 Reportable Quantity (RQ)

None

RCRA Hazardous Waste Classification (40 CFR 261)

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Not Applicable

## TSCA Status

Exempt from TSCA, subject to EJERA

## **16. OTHER INFORMATION**

<u>NFPA Hazard Ratings</u>		<u>HMIS Hazard Ratings</u>		
Health:	2	Health:	2	0 Minimal
Flammability:	1	Flammability:	1	1 Slight
Instability:	0	Reactivity:	0	2 Moderate

For non-emergency questions about this product call:

1-800-334-9481

Original Issued Date: 04/11/2002

Revision Date:

Replaces:

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein.

RSVP# : SCP-955-00349A

End of MSDS

# MATERIAL SAFETY DATA SHEET



DATE PREPARED: 04/19/2004  
MSDS No: 7198

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** ORTHO® Weed B Gon® MAX™

**PRODUCT DESCRIPTION:** Herbicide

### MANUFACTURER

The ORTHO Group  
P.O. Box 190  
Marysville, OH 43040

### 24 HR. EMERGENCY TELEPHONE NUMBERS

CHEMTREC (U.S.): (800) 424-9300  
Emergency Phone: 1-800-225-2883

EPA REG. NO.: 239-2682 PN: 7084

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>Wt.%</u>	<u>CAS#</u>
Mecoprop-p, dimethylamine salt	0.22	66423-09-4
2,4-D, dimethylamine salt	0.12	2008-39-1
Dicamba, dimethylamine salt	0.05	2300-66-5
Other Ingredients	99.61	

## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

**IMMEDIATE CONCERNS:** CAUTION - Avoid contact with eyes, skin, or clothing. - Wash thoroughly with soap and water after handling. - KEEP OUT OF REACH OF CHILDREN

### POTENTIAL HEALTH EFFECTS

**EYES:** No adverse eye effects are expected from product contact.

**SKIN:** This substance is not expected to cause prolonged or significant skin irritation. If absorbed through the skin, this substance is considered practically non-toxic. See Toxicological Information, Section 11.

**INGESTION:** If swallowed, this substance is considered practically non-toxic.

**INHALATION:** If inhaled, this substance is considered practically non-toxic. See Toxicology Information, Section 11.

## 4. FIRST AID MEASURES

**EYES:** Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. Call a poison control center or doctor for treatment advice.

**SKIN:** If on skin or clothing, take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.

**INGESTION:** If swallowed, call a poison control center or doctor immediately for treatment advice. Have person sip glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Never give anything by mouth to an unconscious person.

**INHALATION:** Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

**COMMENTS:** See product label for specific First Aid Measures. The above measures are the most conservative - Pesticide Registration (PR) Notice 2001-1, January 2, 2001, and would apply in the event a product label is not immediately available.

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## 5. FIRE FIGHTING MEASURES

**EXTINGUISHING MEDIA:** CO<sub>2</sub>, Dry Chemical, Foam, Water Fog.

**HAZARDOUS COMBUSTION PRODUCTS:** Normal combustion forms carbon dioxide, water vapor and may produce oxides of nitrogen. Incomplete combustion can produce carbon monoxide.

**FIRE FIGHTING PROCEDURES:** Smoke from fires involving this material may present unusual hazards. Avoid breathing smoke and mists. Avoid contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment. Contain and isolate runoff and debris for proper disposal. Read the entire document.

---

## 6. ACCIDENTAL RELEASE MEASURES

**SMALL SPILL:** Soak up spilled material with paper towels and discard in trash.

**LARGE SPILL:** Dike or contain release. Collect material into drums. Absorb with sand, or other inert materials. Clean spill area of residues and absorbent.

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## 7. HANDLING AND STORAGE

**GENERAL PROCEDURES:** Keep pesticide in original container. Do not put concentrate or diluted product into food or drink containers. Store in a secure, preferably locked, storage area. Protect container from freezing.

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**ENGINEERING CONTROLS:** No special ventilation is normally required. However, if operating conditions create airborne concentrations which exceed the recommended exposure standards (in Section 8), then special ventilation may be required.

### PERSONAL PROTECTION

**EYES AND FACE:** For application of product in accordance with label instructions, no special eye protection is needed. Workers involved in product manufacture should wear appropriate eye/face protection during operations where there is a potential for exposure.

**SKIN:** Wear protective clothing when handling or applying this product including long pants, long sleeved shirt, socks, shoes, and chemical resistant gloves. Wash nondisposable gloves thoroughly with soap and water before removing. Remove contaminated clothing and launder separately before reuse. Promptly and thoroughly wash hands and exposed skin with soap and water after using this product.

**RESPIRATORY:** Handling of the undiluted product is not likely to present an airborne exposure concern under normal use conditions. In the event of an accidental discharge of the material during manufacture or handling which produces a heavy vapor or mist, workers should use respiratory protection equipment. Consult respirator manufacturer to determine appropriate type of equipment. Observe respirator use limitations specified by NIOSH MSHA or the manufacturer. For application of product diluted in accordance with label instructions, no special respiratory protection is required. Read and follow label precautions.

### OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):

<u>Chemical Name</u>	<u>EXPOSURE LIMITS</u>		
	<u>OSHA PEL</u>	<u>ACGIH TLV</u>	<u>ACGIH STEL</u>
Mecoprop-p, dimethylamine salt	None	None	None
2,4-D, dimethylamine salt	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	None
Dicamba, dimethylamine salt	None	None	

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE:** Liquid

**ODOR:** Slight amine odor.

**COLOR:** Clear, light-brown.

**pH:** 7.14 (1% solution in water)

**BOILING POINT:** (212°F)

**DENSITY:** 1.0028 g/ml

**OXIDIZING PROPERTIES:** Non-reactive with water, kerosene, monoammonium phosphate, zinc, and ammonium nitrate.

**COMMENTS:** Product not corrosive when in contact with high density polyethylene, aluminum, stainless steel, or carbon steel for 32 days at 42 degrees C.

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## 10. STABILITY AND REACTIVITY

**STABLE:** YES

**HAZARDOUS POLYMERIZATION:** NO

**HAZARDOUS DECOMPOSITION:** Partial combustion may form carbon monoxide and nitrogen oxides.

**INCOMPATIBLE MATERIALS:** None known.

---

## 11. TOXICOLOGICAL INFORMATION

### ACUTE

**EYES:** Non-irritating (rabbit).

**DERMAL LD<sub>50</sub>:** LD50 (rabbit): > 5000 mg/kg (practically non-toxic).

**ORAL LD<sub>50</sub>:** LD50 (rat): >5,000 mg/kg body weight (practically non-toxic).

**INHALATION LC<sub>50</sub>:** The LC50 4-hour inhalation exposure for rats is >2.06 mg/L air.

**SENSITIZATION:** Guinea pig - Not a dermal sensitizer.

### CARCINOGENICITY:

**CARCINOGENICITY COMMENTS:** Based on the results of animal toxicology studies, epidemiological investigations and findings from scientific review groups, 2,4-D is not considered to be a carcinogen. The EPA has classed 2,4-D in carcinogenic category "D" meaning the weight of the scientific evidence does not demonstrate a cause and effect relationship between 2,4-D and cancer.

**NEUROTOXICITY:** Numerous neurotoxicity studies involving several species, using high dose and repeated administration of 2,4-D, failed to demonstrate any clinically or histological evidence that the chemical is a neurotoxin.

**REPRODUCTIVE TOXIN:** 2,4-D has not demonstrated adverse reproductive effects or to have been associated with any teratological or birth defects.

**MUTAGENICITY:** 2,4-D is not considered a mutagen.

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## 12. ECOLOGICAL INFORMATION

**ECOTOXICOLOGICAL INFORMATION:** This product is toxic to aquatic invertebrates. Drift or runoff may adversely affect aquatic invertebrates and nontarget plants. Do not apply directly to water. Do not contaminate water when disposing of equipment washwaters.

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## 13. DISPOSAL CONSIDERATIONS

**FOR LARGE SPILLS:** Material collected that cannot be reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state, or local procedures.

**PRODUCT DISPOSAL:** Call local solid waste agency or 1-800-CLEANUP for disposal instructions. Never place unused product down any drain.

**EMPTY CONTAINER:** Carefully follow label instructions for product disposal. Do not reuse container. Place empty container in trash or offer for recycling if available.

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## 14. TRANSPORT INFORMATION

**DOT (DEPARTMENT OF TRANSPORTATION)****PROPER SHIPPING NAME:** Not Regulated**U.S. SURFACE FREIGHT CLASS:** Tree or weed killing compounds, NOI**OTHER SHIPPING INFORMATION:** DOT and CERCLA Reportable Quantity (RQ) is 1000 lbs. (for Dimethylamine).DOT and CERCLA Reportable Quantity (RQ) is 1000 lbs. (for Dicamba).DOT and CERCLA Reportable Quantity (RQ) is 100 lbs. (for 2,4-D).

**SPECIAL SHIPPING NOTES:** The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

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## 15. REGULATORY INFORMATION

**UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)**

PRODUCT CLASSIFICATION UNDER SECTION 311 OF SARA				
ACUTE: NO	CHRONIC: NO	FIRE: NO	REACTIVITY: NO	PRESSURE GENERATING: NO

**313 REPORTABLE INGREDIENTS:** Mecoprop (CAS 93-65-2); Dicamba (CAS 1918-00-9); Dimethylamine (CAS 124-40-3). De Minimis Concentrations for Section 313 of EPCRA is 1.0%.

**TSCA (TOXIC SUBSTANCE CONTROL ACT)**

**TSCA REGULATORY:** All non FIFRA regulated components are on the US EPA's TSCA Inventory List.

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## 16. OTHER INFORMATION

**NFPA CODES****FIRE: 0    HEALTH: 2    REACTIVITY: 0****APPROVAL DATE:** 04/19/2004**REVISION SUMMARY** New MSDS

**ADDITIONAL MSDS INFORMATION:** NFPA Hazard Rating: 0=Least; 1=Slight; 2=Moderate; 3=High; 4=Severe.

**GENERAL STATEMENTS:** This document contains health, safety, and environmental information useful to emergency response agencies, health care providers, manufacturers, and workers/employees. It does not replace the precautionary language, use directions, or the storage and disposal information found on the product label.

**COMMENTS:** Use of this product is regulated by the U.S. Environmental Protection Agency (EPA) through the approved product label. It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**MANUFACTURER DISCLAIMER:** The information contained herein is, to the best of the Manufacturer's (see Section 1) knowledge and belief, accurate and reliable as of the date of preparation of this document. However, no warranty or guarantee, express or implied, is made as to the accuracy or reliability, and the Manufacturer shall not be liable for any loss or damage arising out of the use thereof. No authorization is given or implied to use any patented invention without a license. In addition, the Manufacturer shall not be liable for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

Date Issued:  
Supersedes:

November, 2004  
November, 2003

**MATERIAL SAFETY DATA SHEET**  
**ZOECON® ALTOSID® LIQUID LARVICIDE CONCENTRATE**

**Manufacturer:** Wellmark International

**Address:** 1501 E. Woodfield Rd., Suite 200 West, Schaumburg, IL 60173

**Emergency Phone:** 1-800-248-7763

**Transportation Emergency Phone:** CHEMTREC: 1-800-424-9300

**1. CHEMICAL PRODUCT INFORMATION**

**Product Name:** Zoecon Altosid® Liquid Larvicide Concentrate

**Chemical Name/Synonym:** (S)-Methoprene; isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate

**Chemical Family:** Terpenoid

**Formula:** C<sub>19</sub>H<sub>34</sub>O<sub>3</sub>

**EPA Registration No.:** 2724-446

**RF Number:** 437

**2. COMPOSITION / INFORMATION ON INGREDIENTS**

<u>Component (chemical, common name)</u>	<u>CAS Number</u>	<u>Weight</u>	<u>Tolerance</u>
(S)- Methoprene: Isopropyl (2E,4E,7S)-11-Methoxy-3,7,11-trimethyl-2,4-dodecadienoate	65733-16-6	20.0%	Not established
Inert ingredients (non-hazardous and/or trade secret)		80%.0	N/A

**3. HAZARD INFORMATION**

**PRECAUTIONARY STATEMENT**

Caution: Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling..Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE**

No adverse reactions have resulted from normal human exposure during research and testing.

**PRIMARY ROUTE OF ENTRY**      Dermal/Eye: Yes      Oral: No      Inhalation: No

**ACUTE TOXICITY**      Oral: LD50 (rat): >34,000 mg/kg (highest dose tested) (HDT) (Based on (S) Methoprene)

Dermal: LD50 (rabbit): >2000 mg/kg (highest dose tested) (HDT) (Based on (S) Methoprene)

Inhalation: LC50 (rat): >5.19 mg/L air (Based on (S) Methoprene)

## OTHER TOXICOLOGICAL INFORMATION

**Skin Irritation:** Non-irritating (rabbit) (Based on (S) Methoprene)

**Eye Irritation:** Practically non-irritating (rabbit) (Based on (S) Methoprene)

**Sensitizer:** Not a sensitizer (guinea pig) (Based on (S) Methoprene)

## 4. FIRST AID MEASURES

**Eye:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

**Skin:** Take off contaminated clothing. Rinse skin immediately with soap and water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

**Ingestion:** Drink 1-2 glasses of water and try to induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.

**Inhalation:** Remove victim to fresh air. See a physician if cough or other respiratory symptoms develop.

**Note to Physician:** Treat symptomatically

## 5. FIRE FIGHTING MEASURES

**NFPA Rating:** Health: 0 Fire: 0 Reactivity: 0

**Flammability Class:** N/A

**Flash Point:** Does not flash

**Explosive Limits (% of Volume):** None

**Extinguishing Media:** Water, foam, CO<sub>2</sub>

**Special Protective Equipment:** Firefighters should wear protective clothing and self contained breathing apparatus.

**Fire Fighting Procedures:** Normal procedures. Do not allow fire fighting water to escape into waterways or sewers.

**Combustion Products:** Carbon monoxide, carbon dioxide

**Unusual Fire/Explosion Hazards:** None

## 6. ACCIDENTAL RELEASE MEASURES

**Steps to be taken:** In case of leakage or spill, soak up with absorbent material. Place in a container for disposal.

**Absorbents:** Clay granules, sawdust, dirt or equivalent.

**Incompatibles:** None

## 7. HANDLING AND STORAGE

**Handling:** Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling.

**Storage:** Store in a cool, dry place, away from other pesticides, food and feed.

## **8. EXPOSURE CONTROL / PERSONAL MEASURES**

**Exposure Limits:** Not established

**Ventilation:** Use with adequate ventilation.

**Personal Protective Equipment:** Under ordinary use conditions, no special protection is required. If prolonged exposure is expected, it is recommended to wear a MSHA/NIOSH approved organic vapor/pesticide respirator, impervious gloves, chemical goggles or safety glasses with side shields.

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Creamy, yellow liquid with slight odor.

**Boiling Point:** 100 C

**Melting Point:** Not applicable

**Vapor Pressure (mm Hg):** 17.5 mm Hg

**Vapor Density (Air = 1):** 0.6 (water phase)

**Specific Gravity:** 1.04 - 1.06

**Bulk Density:** 8.3 lbs/gal

**Solubility:** Disperses in water

**Evaporation Rate:** Approximately 0.8

**pH:** 6.3 - 6.8

## **10. STABILITY AND REACTIVITY**

**Stability:** Stable

**Reactivity:** Non-reactive

**Incompatibility w/ Other Materials:** Bleach, oxidizing/alkaline materials

**Decomposition Products:** None

**Hazardous Polymerization:** Will not occur

## **11. TOXICOLOGICAL INFORMATION**

### **CHRONIC TOXICITY [Based on (RS)-Methoprene]**

Methoprene is not considered as an oncogenic compound. The NOEL for non-carcinogen effects in an 18-month mouse study was 250ppm.

### **DEVELOPMENTAL/REPRODUCTIVE TOXICITY [Based on (RS)-Methoprene]**

Methoprene is not a teratogenic compound. The NOEL for maternal and embryo toxicity in rabbits was 200/mg/kg/day. The NOEL for reproductive effects in rats was 500 ppm.

### **MUTAGENICITY [Based on (RS)-Methoprene]**

Methoprene is not a mutagenic compound.

## 12. ECOLOGICAL INFORMATION

### ENVIRONMENTAL FATE [Based on (RS)-Methoprene]

**Hydrolysis:** T<sub>1/2</sub> > 4 weeks

**Photolysis:** T<sub>1/2</sub> < 10 hours

**Soil half life:** ~ 10 days

**Water solubility:** < 2 ppm

### ECOTOXICITY [Based on (S)-Methoprene]

**Acute Toxicity:** fish:LC50 (trout): 760 ppb, (bluegill): > 370 ppb ;  
**aquatic invertebrates:**LC50 (Daphnia): 360 ppb

## 13. DISPOSAL CONSIDERATIONS

Do not contaminate water, food, or feed by disposal. **Pesticide Disposal:** Wastes resulting from this product may be disposed of on site or at an approved waste management facility. **Container Disposal:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

## 14. TRANSPORT INFORMATION

**DOT49CFR Description:** Not regulated as hazardous by D.O.T., I.A.T.A. or I.M.D.G.

**Freight Classification:** Insecticides, NOI other than poison in boxes or drums. NMFC 102120

## 15. REGULATORY INFORMATION

**CERCLA (Superfund):** Not regulated

**RCRA:** Not regulated as hazardous

### SARA 311/312 HAZARD CATEGORIES

**Immediate Health:** Yes (irritation)

**Delayed Health:** No

**Fire:** No

**Sudden Pressure:** No

**Reactivity:** No

*The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all inclusive and the manner and conditions of use and handling may involve other or additional considerations.*

**MATERIAL SAFETY DATA SHEET**  
**ZOECON ALTOSID® XR EXTENDED RESIDUAL BRIQUETS**

**Manufacturer:** Wellmark International

**Address:** 1501 E. Woodfield Rd., Suite 200 West, Schaumburg, IL 60173

**Emergency Phone:** 1-800-248-7763

**Transportation Emergency Phone:** CHEMTREC: 1-800-424-9300

**1. CHEMICAL PRODUCT INFORMATION**

**Product Name:** Zoecon Altosid® XR Extended Residual Briquets

**Chemical Name/Synonym:** (S)-Methoprene; isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate

**Chemical Family:** Terpenoid

**Formula:** C<sub>19</sub> H<sub>34</sub> O<sub>3</sub>

**EPA Registration No.:** 2724-421

**RF Number:** 292A

**2. COMPOSITION / INFORMATION ON INGREDIENTS**

<u>Component (chemical, common name)</u>	<u>CAS Number</u>	<u>Weight</u>	<u>Tolerance</u>
(S)- Methoprene: Isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate	65733-16-6	2.1%	Not established
Inert ingredients (non-hazardous and/or trade secret)		97.9%	

**3. HAZARD INFORMATION**

**PRECAUTIONARY STATEMENT**

Caution: Keep out of the reach of children.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE**

No adverse reactions have resulted from normal human exposure during research and testing. Adverse animal reactions to this product have not been shown.

**PRIMARY ROUTE OF ENTRY**      Dermal/Eye: Yes      Oral: Yes      Inhalation No

**ACUTE TOXICITY**      Oral: LD50 (rat): >34,000 mg/kg (highest dose level tested) (Based on (S)-Methoprene)

Dermal: LD50 (rabbit): >2,000 mg/kg (Hot) (highest dose level tested) (Based on (S)-Methoprene)

Inhalation: LC50 (rat): Not applicable to this product form

**OTHER TOXICOLOGICAL INFORMATION**

**Skin Irritation:** Non-irritating (rabbit) (Based on (S) Methoprene)

**Eye Irritation:** Mild/moderate irritation, corneal opacity at 1 hour - all animals clear by 72 hours (rabbit) (Based on (S) Methoprene)

**Sensitizer:** Not a sensitizer (guinea pig) (Based on (S) Methoprene)

#### **4. FIRST AID MEASURES**

- Eye:** Hold eye open and flush slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye.
- Skin:** Wash material off with soap and water. Remove contaminated clothing and footwear. See a physician if symptoms persist.
- Ingestion:** Drink 1-2 glasses of water and try to induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.
- Inhalation:** Although this is not a primary route of entry, remove victim to fresh air. See a physician if cough or other respiratory symptoms develop
- Note to Physician:** Treat symptomatically

#### **5. FIRE FIGHTING MEASURES**

- NFPA Rating:** Health: 0      Fire: 0      Reactivity: 0
- Flammability Class:** N/A
- Flash Point:** Does not flash
- Explosive Limits (% of Volume):** N/A
- Extinguishing Media:** Water, foam, dry chemical
- Special Protective Equipment:** Firefighters should wear protective clothing, eye protection, and self contained breathing apparatus.
- Fire Fighting Procedures:** Normal procedures. Do not allow run-off to enter waterways inhabited by aquatic organisms
- Combustion Products:** None known
- Unusual Fire/Explosion Hazards:** None

#### **6. ACCIDENTAL RELEASE MEASURES**

- Steps to be taken:** Sweep up material and place in a container for disposal. Do not allow spill to enter waterways inhabited by aquatic organisms
- Absorbents:** Not necessary due to product form and packaging
- Incompatibles:** None

#### **7. HANDLING AND STORAGE**

- Handling:** Avoid contact with eyes or clothing. Do not remove briquets from container except for immediate use. Avoid breathing dust. Wash thoroughly with soap and water after handling.
- Storage:** Store in a cool, dry place. Do not contaminate food or feed by storage or disposal. Keep away from children.

#### **8. EXPOSURE CONTROL / PERSONAL MEASURES**

- Exposure Limits:** Not Applicable
- Ventilation:** Use with adequate ventilation.
- Personal Protective Equipment:** Under ordinary use conditions, no special protection is required. If prolonged exposure is expected, it is recommended to wear a MSHA/NIOSH approved organic vapor/pesticide respirator, impervious gloves, chemical goggles or safety glasses with side shields.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance and Odor:** Grey to black solid with slight hydrocarbon odor.  
**Boiling Point:** N/A  
**Melting Point:** N/A  
**Vapor Pressure (mm Hg):** N/A  
**Vapor Density (Air = 1):** N/A  
**Specific Gravity:** 1.8492 g/cc  
**Bulk Density:** N/A  
**Solubility:** 1 ppm  
**Evaporation Rate:** N/A  
**pH:** N/A

## 10. STABILITY AND REACTIVITY

**Stability:** Stable  
**Reactivity:** Non-reactive  
**Incompatibility w/ Other Materials:** None  
**Decomposition Products:** None  
**Hazardous Polymerization:** Will not occur

## 11. TOXICOLOGICAL INFORMATION

### CHRONIC TOXICITY [Specific to Active Ingredient(s)]

Methoprene is not considered as an oncogenic compound. The NOEL for non-carcinogen effects in an 18-month mouse study was 250ppm.

### DEVELOPMENTAL/REPRODUCTIVE TOXICITY [Specific to Active Ingredient(s)]

Methoprene is not a teratogenic compound. The NOEL for maternal and embryo toxicity in rabbits was 200/mg/kg/day. The NOEL for reproductive effects in rats was 500 ppm.

### MUTAGENICITY [Specific to Active Ingredient(s)]

Methoprene is not a mutagenic compound.

## 12. ECOLOGICAL INFORMATION

### ENVIRONMENTAL FATE [Based on (RS)-Methoprene]

**Hydrolysis:** T1/2 > 4 weeks

**Photolysis:** T1/2 < 10 hours

**Soil half life:** ~ 10 days

**Water solubility:** < 2 ppm

### ECOTOXICITY [Based on (S)-Methoprene]

**Acute Toxicity:** fish:LC50 (trout): 760 ppb, (bluegill): > 370 ppb ((S)-Methoprene); aquatic invertebrates:LC50 (Daphnia): 360 ppb ((S)-Methoprene This product is toxic to aquatic dipteran. )

### **13. DISPOSAL CONSIDERATIONS**

Dispose of empty bag in sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

### **14. TRANSPORT INFORMATION**

**DOT49CFR Description:** Not regulated as hazardous by D.O.T.

**Freight Classification:** Insecticides, NOI other than poison in boxes or drums. NMFC 102120

### **15. REGULATORY INFORMATION**

**CERCLA (Superfund):** Not regulated

**RCRA:** Not regulated as hazardous

#### **SARA 311/312 HAZARD CATEGORIES**

**Immediate Health:** Yes (irritation)

**Delayed Health:** No

**Fire:** No

**Sudden Pressure:** No

**Reactivity:** No

*The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all inclusive and the manner and conditions of use and handling may involve other or additional considerations.*

## MATERIAL SAFETY DATA SHEET **ZOECON® ALTOSID PELLETS**

**Manufacturer:** Wellmark International

**Address:** 1501 E. Woodfield Rd., Suite 200 West, Schaumburg, IL 60173

**Emergency Phone:** 1-800-248-7763

**Transportation Emergency Phone:** CHEMTREC: 1-800-424-9300

### 1. CHEMICAL PRODUCT INFORMATION

**Product Name:** Zoecon® Altosid Pellets

**Chemical Name/Synonym:** (S)-Methoprene; Isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate

**Chemical Family:** Terpenoid

**Formula:** C<sub>19</sub>H<sub>34</sub>O<sub>3</sub>

**EPA Registration No.:** 2724-448

**RF Number:** 330

### 2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Component (chemical, common name)</u>	<u>CAS Number</u>	<u>Weight</u>	<u>Tolerance</u>
(S)- Methoprene: Isopropyl (2E,4E,7S)-11-Methoxy-3,7,11-trimethyl-2,4-dodecadienoate	65733-16-6	4.25%	Not established
Inert ingredients: (nonhazardous and/or trade secret):		95.75%	

### 3. HAZARD INFORMATION

#### PRECAUTIONARY STATEMENT

Caution: Keep out of the reach of children.

#### SIGNS AND SYMPTOMS OF OVEREXPOSURE

No adverse reactions have resulted from normal human exposure during research and testing. Adverse animal reactions to this product have not been shown.

**PRIMARY ROUTE OF ENTRY**    Dermal/Eye: Yes    Oral: No    Inhalation: Yes

**ACUTE TOXICITY**    Oral: LD<sub>50</sub> (rat): >34,000 mg/kg (HDT) (Based on (S)-Methoprene)  
Dermal: LD<sub>50</sub> (rabbit): >2,000 mg/kg (HDT) (Based on (S)-Methoprene)  
Inhalation: LC<sub>50</sub> (rat) >5.19 mg/L air (Based on (S)-Methoprene)

#### OTHER TOXICOLOGICAL INFORMATION

**Skin Irritation:** Non-irritating (rabbit) (Based on (S)-Methoprene)  
**Eye Irritation:** Practically non-irritating (rabbit) (Based on (S)-Methoprene)  
**Sensitizer:** Not a sensitizer (guinea pig) (Based on (S)-Methoprene)

#### **4. FIRST AID MEASURES**

- Eye:** Hold eye open and flush slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye.
- Skin:** Wash material off with copious amounts of water and soap. Remove contaminated clothing and footwear. See a physician if symptoms persist.
- Ingestion:** Drink 1-2 glasses of water and try to induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.
- Inhalation:** Remove victim to fresh air. See a physician if cough or other respiratory symptoms develop
- Note to Physician:** Treat symptomatically

#### **5. FIRE FIGHTING MEASURES**

- NFPA Rating:** Health: 0      Fire: 0      Reactivity: 0
- Flammability Class:** N/A
- Flash Point:** Does not flash
- Explosive Limits (% of Volume):** N/A
- Extinguishing Media:** Water, foam, dry chemical
- Special Protective Equipment:** Firefighters should wear protective clothing, eye protection, and self contained breathing apparatus.
- Fire Fighting Procedures:** Normal procedures. Do not allow run-off to enter waterways inhabited by aquatic organisms
- Combustion Products:** None known
- Unusual Fire/Explosion Hazards:** None

#### **6. ACCIDENTAL RELEASE MEASURES**

- Steps to be taken:** Sweep up material and place in a container for disposal. Do not allow spill to enter waterways inhabited by aquatic organisms
- Absorbents:** None necessary due to product form and packaging
- Incompatibles:** None

#### **7. HANDLING AND STORAGE**

- Handling:** Avoid contact with eyes or clothing. Avoid breathing dust. Wash thoroughly with soap and water after handling.
- Storage:** Store closed containers of Altosid pellets in a cool, dry place. Do not contaminate water, food or feed by storage or by disposal.

#### **8. EXPOSURE CONTROL / PERSONAL MEASURES**

- Exposure Limits:** Not applicable
- Ventilation:** Use with adequate ventilation.
- Personal Protective Equipment:** Under ordinary use conditions, no special protection is required. If prolonged exposure is expected, it is recommended to wear a MSHA/NIOSH approved organic vapor/pesticide respirator, impervious gloves, chemical goggles or safety glasses with side shields.

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Dark grey to black pellets with slight hydrocarbon odor.  
**Boiling Point:** N/A  
**Melting Point:** N/A  
**Vapor Pressure (mm Hg):** N/A  
**Vapor Density (Air = 1):** N/A  
**Specific Gravity:** 1.04 g/cc  
**Bulk Density:** N/A  
**Solubility:** 1 ppm  
**Evaporation Rate:** N/A  
**pH:** N/A

## **10. STABILITY AND REACTIVITY**

**Stability:** Stable  
**Reactivity:** Non-reactive  
**Incompatibility w/ Other Materials:** None  
**Decomposition Products:** None  
**Hazardous Polymerization:** Will not occur

## **11. TOXICOLOGICAL INFORMATION**

### **CHRONIC TOXICITY [Based on (RS)-Methoprene]**

Methoprene is not considered as an oncogenic compound. The NOEL for non-carcinogen effects in an 18-month mouse study was 250ppm.

### **DEVELOPMENTAL/REPRODUCTIVE TOXICITY [Based on (RS)-Methoprene]**

Methoprene is not a teratogenic compound. The NOEL for maternal and embryo toxicity in rabbits was 200/mg/kg/day. The NOEL for reproductive effects in rats was 500 ppm.

### **MUTAGENICITY [Based on (RS)-Methoprene]**

Methoprene is not a mutagenic compound.

## **12. ECOLOGICAL INFORMATION**

### **ENVIRONMENTAL FATE [Based on (RS)-Methoprene]**

**Hydrolysis:** T1/2 > 4 weeks ((S)-Methoprene)  
**Photolysis:** T1/2 < 10 hours ((S)-Methoprene)  
**Soil half life:** ~ 10 days ((S)-Methoprene)  
**Water solubility:** < 2 ppm ((S)-Methoprene)

### **ECOTOXICITY [Based on (S)-Methoprene]**

**Acute Toxicity:** fish:LC50 (trout): 760 ppb, (bluegill): > 370 ppb ((S)-Methoprene);  
**aquatic invertebrates:**LC50 (Daphnia): 360 ppb ((S)-Methoprene)

### **13. DISPOSAL CONSIDERATIONS**

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

### **14. TRANSPORT INFORMATION**

**DOT49CFR Description:** Not regulated as hazardous by D.O.T.

**Freight Classification:** Insecticides, NOI other than poison in boxes or drums. NMFC 102120

### **15. REGULATORY INFORMATION**

**CERCLA (Superfund):** Not regulated

**RCRA:** Not regulated as hazardous

#### **SARA 311/312 HAZARD CATEGORIES**

**Immediate Health:** Yes (irritant)

**Delayed Health:** No

**Fire:** No

**Sudden Pressure:** No

**Reactivity:** No

*The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all inclusive and the manner and conditions of use and handling may involve other or additional considerations.*

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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MATERIAL NAME: Vectobac(R) G  
Vectobac(R) 200G  
Vectobac(R) Granules  
EPA Registration No. 73049-10  
Drug Code: 15571 \* 15539  
List Number: 5108

MANUFACTURER: Valent BioSciences Corporation  
870 Technology Way, Suite 100  
Libertyville, Illinois 60048

**EMERGENCY TELEPHONE NUMBERS**

Emergency Health or Spill:

Outside the United States: 651-632-6184  
Within the United States: 877-315-9819

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

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INGREDIENT NAME: *Bacillus thuringiensis*, subsp. *israelensis*  
CONCENTRATION: .2000 %  
CAS/RTECS NUMBERS: N/A / N/A  
OSHA-PEL 8HR TWA: N/L  
                  STEL: N/L  
                  CEILING: N/L  
ACGIH-TLV 8HR TWA: N/L  
                  STEL: N/L  
                  CEILING: N/L  
OTHER        8HR TWA: N/A  
LIMITS       STEL: N/A  
                  CEILING: N/A

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2. COMPOSITION/INFORMATION ON INGREDIENTS, continued

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INGREDIENT NAME: Inert Ingredients - identity withheld as a Trade Secret  
CONCENTRATION: 99.8000 %  
CAS/RTECS NUMBERS: N/A / N/A  
OSHA-PEL 8HR TWA: 15 mg/m<sup>3</sup> total dust, 5 mg/m<sup>3</sup> respirable fraction for a minor component  
      STEL: N/L  
      CEILING: N/L  
ACGIH-TLV 8HR TWA: 10 mg/m<sup>3</sup> for a minor component  
      STEL: N/L  
      CEILING: N/L  
OTHER      8HR TWA: N/A  
LIMITS      STEL: N/A  
              CEILING: N/A  
  
EEC (European Community): N/A  
      Symbol Designation: N/A  
      Risk Phrases: N/A  
      Safety Phrases: N/A

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3. HAZARDS INFORMATION

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EMERGENCY OVERVIEW: May be irritating to skin and eyes.

ROUTE(S) OF ENTRY:           Skin: No  
                                  Inhalation: N/D  
                                  Ingestion: No

INGESTION RATING: None

SKIN ABSORPTION RATING: None

INHALATION RATING: N/D

CORROSIVENESS RATING: N/D

SKIN CONTACT RATING: None

SKIN SENSITIZATION RATING: N/D

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3. HAZARDS INFORMATION, continued

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EYE CONTACT RATING: None

TARGET ORGANS: N/D

CARCINOGENICITY RATING: NTP: N/L IARC: N/L OSHA: N/L

ACGIH: N/L

None

SIGNS AND SYMPTOMS: N/D. Direct contact with eyes or skin may cause mild irritation.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: N/D. Data suggest pre-existing skin or eye lesions.

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4. FIRST AID MEASURES

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EYES: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

SKIN: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

INGESTION: Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

INHALATION: Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

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5. FIRE FIGHTING PROCEDURES

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FLASH POINT: N/A

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5. FIRE FIGHTING PROCEDURES, continued

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FLASH POINT METHOD: N/D  
LOWER EXPLOSIVE LIMIT(%): N/D  
UPPER EXPLOSIVE LIMIT(%): N/D  
AUTOIGNITION TEMPERATURE: N/D

FIRE & EXPLOSION HAZARDS: N/D.

EXTINGUISHING MEDIA: Use appropriate medium for underlying cause of fire.

FIRE FIGHTING INSTRUCTIONS: Wear protective clothing and self-contained breathing apparatus.

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6. ACCIDENTAL RELEASE MEASURES

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SPILL OR RELEASE PROCEDURES: Recover product. Place into appropriate container for disposal. Avoid dust. Ventilate and wash spill area.

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7. HANDLING AND STORAGE

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HANDLING: N/D.

STORAGE: Store in a cool, dry place.

SPECIAL PRECAUTIONS: N/A

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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ENGINEERING CONTROLS: Use local exhaust.

RESPIRATORY PROTECTION: Air purifying respirator with dust/mist filter(N95), if needed.

SKIN PROTECTION: Impervious.

EYE PROTECTION: Safety glasses or goggles.

OTHER PROTECTION: Wear tyvek coveralls during dusty operations.

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9. PHYSICAL AND CHEMICAL PROPERTIES

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APPEARANCE/PHYSICAL STATE: Granular solid.

ODOR: N/D

BOILING POINT: N/A

MELTING/FREEZING POINT: N/A

VAPOR PRESSURE (mm Hg): N/A

VAPOR DENSITY (Air=1): N/A

EVAPORATION RATE: N/D

BULK DENSITY: N/A

SPECIFIC GRAVITY: N/D

SOLUBILITY: N/A

pH: N/A

VISCOSITY: N/A

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10. STABILITY AND REACTIVITY

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CHEMICAL STABILITY: N/D

INCOMPATIBILITIES: Alkalinity inactivates product.

HAZARDOUS DECOMPOSITION PRODUCTS: N/D.

HAZARDOUS POLYMERIZATION: N/D.

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11. TOXICOLOGICAL INFORMATION

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ORAL TOXICITY: N/D. LD<sub>50</sub> > 2,670 mg/kg in rats for a formulation of the active ingredient.

DERMAL TOXICITY: N/D. LD<sub>50</sub> > 6,280 mg/kg in rabbits for a formulation of the active ingredient.

INHALATION TOXICITY: N/D

CORROSIVENESS: N/D

DERMAL IRRITATION: N/D. Mild irritation was noted in a dermal toxicity study in rabbits with a formulation of the active ingredient.

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11. TOXICOLOGICAL INFORMATION, continued

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OCULAR IRRITATION: N/D. Vectobac(R) Technical Powder was mildly irritating in an eye irritation test in rabbits.

DERMAL SENSITIZATION: N/D

SPECIAL TARGET ORGAN EFFECTS: N/D

CARCINOGENICITY INFORMATION: N/D

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12. ECOLOGICAL INFORMATION

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ECOLOGICAL INFORMATION: N/D

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13. DISPOSAL CONSIDERATIONS

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WASTE DISPOSAL METHODS: Dispose of product in accordance with federal, state, and local regulations.

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14. TRANSPORTATION INFORMATION

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DOT STATUS: Not Regulated  
PROPER SHIPPING NAME: N/D  
HAZARD CLASS: N/D  
UN NUMBER: N/D  
PACKING GROUP: N/D  
REPORTABLE QUANTITY: N/D

IATA/ICAO STATUS: Not Regulated  
PROPER SHIPPING NAME: N/D  
HAZARD CLASS: N/D  
UN NUMBER: N/D  
PACKING GROUP: N/D  
REPORTABLE QUANTITY: N/D

---

14. TRANSPORTATION INFORMATION, continued

---

IMO STATUS: Not Regulated

PROPER SHIPPING NAME: N/D

HAZARD CLASS: N/D

UN NUMBER: N/D

PACKING GROUP: N/D

REPORTABLE QUANTITY: N/D

FLASH POINT: N/A

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15. REGULATORY INFORMATION

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TSCA STATUS: Exempt

CERCLA STATUS: N/D

SARA STATUS: N/D

RCRA STATUS: N/D

PROP 65 (CA): N/D

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16. OTHER INFORMATION

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LEGEND: N/A = Not Applicable

N/D = Not Determined

N/L = Not Listed

L = Listed

C = Ceiling

S = Short-term

(R) = Registered Trademark of Valent BioSciences

(TM) = Registered Trademark of Valent BioSciences

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16. OTHER INFORMATION, continued  
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The information and recommendations contained herein are based upon tests believed to be reliable. However, Valent BioSciences does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform with actual conditions of usage may be required. Valent BioSciences assumes no responsibility for results obtained or for incidental or consequential damages arising from the use of these data. No freedom from infringement of any patent, copyright or trademark is to be inferred.



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Libertyville, IL 60048 - 800-323-9597

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**AMVAC CHEMICAL CORPORATION**  
**TRUMPET® EC Insecticide**

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AMVAC MSDS No.: 283\_7

## MATERIAL SAFETY DATA SHEET

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** TRUMPET® EC Insecticide

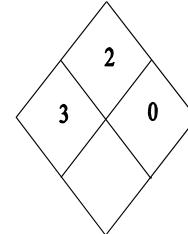
**GENERAL USE:** Insecticide

**PRODUCT DESCRIPTION:** Clear amber liquid with an aromatic solvent odor

**EPA Registration Number:** 5481-481

**MSDS No.:** 283\_7

**Current Revision Date:** 12 December, 2005



**MANUFACTURER:**

AMVAC CHEMICAL CORPORATION  
4100 E. Washington Blvd.  
Los Angeles, CA 90023-4406  
Ph: 323-264-3910  
FAX: 323-268-1028

**EMERGENCY TELEPHONE NUMBERS:**

**MANUFACTURER:** 323-264-3910  
**TRANSPORTATION (24 HOURS)**  
**CHEMTREC:** 800-424-9300  
**OTHER (24 HOURS)**  
**AMVAC:** 323-264-3910

### 2. COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

Component	Naled	DDVP	Naphthalene
<b>Synonyms</b>	1,2-Dibromo-2,2-dichloroethyl dimethylphosphate; DIBROM®	2,2-Dichloroethenyl dimethylphosphate; DICHLORVOS	
<b>CAS Number</b>	300-76-5	62-73-7	91-20-3
<b>Hazard</b>	Poison; Corrosive	Poison, Possible carcinogen	Possible Carcinogen
<b>Wt%, Typical</b>	78.0%	less than 1%	less than 3%
<b>Exposure Limits</b>	OSHA PEL: 3 mg/m <sup>3</sup> ACGIH TLV: 0.1 mg/m <sup>3</sup>	OSHA PEL: 1 mg/m <sup>3</sup> ACGIH TLV 0.1 mg/m <sup>3</sup>	OSHA PEL: 10 ppm ACGIH PEL: 10 ppm ACGIH STEL: 15 ppm

TRUMPET is a registered Trademark of AMVAC Chemical Corporation

**3. HAZARDS IDENTIFICATION**

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**EMERGENCY OVERVIEW:**

**DANGER! POISON! CORROSIVE!** An off-white to straw yellow liquid with a sharp, pungent odor that causes irreversible eye and skin damage. May be fatal if swallowed, inhaled or absorbed through skin and eyes. Is a cholinesterase inhibitor. Rapidly absorbed through skin. Repeated inhalation or skin contact may, without symptoms, progressively increase susceptibility to organophosphate (including Naled) poisoning. May be an aspiration hazard. May cause an allergic reaction.

Product is combustible.

Toxic to fish, birds, and other wildlife.

---

**POTENTIAL HEALTH EFFECTS**

**ROUTE(S) OF ENTRY:** May be fatal if swallowed, inhaled, or absorbed through eye or skin. May produce acute cholinesterase depression. May cause corrosive destruction of the skin, mucous membranes and the eyes.

**SIGNS OF ACUTE OVEREXPOSURE:** Acute cholinesterase depression may be evidenced by headache, nausea, vomiting, diarrhea, abdominal cramps, excessive sweating, salivation and tearing, constricted pupils, blurred vision, tightness in chest, weakness, muscle twitching and confusion; in extreme cases, unconsciousness, convulsions, severe respiratory depression and death may occur.

This product is expected to be corrosive to the eyes. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. Expected adverse health effects resulting from direct exposure to the eye may include pain, tears, swelling, redness, blurred vision, irreversible eye damage and possibly blindness.

This product is expected to be corrosive to the skin. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. The expected adverse health effects resulting from a direct exposure to the skin may include pain or a feeling of heat, discoloration, swelling, blistering, and irreversible tissue damage.

This product is expected to be corrosive to the digestive tract, and, if ingested, may cause nausea, vomiting and diarrhea.

This product is expected to be corrosive to the respiratory tract, and, if inhaled, may cause symptoms that include nasal discharge, sore throat, coughing, bronchitis, pulmonary edema, and difficulty in breathing.

**SIGNS OF CHRONIC OVEREXPOSURE:** Repeated exposures to small doses of Naled and other organophosphates may lower the cholinesterase to levels where the above symptoms of acute overexposure are observed.

### **3. HAZARDS IDENTIFICATION, cont'd**

**CARCINOGENICITY:** There is no evidence of carcinogenicity in laboratory animals tested with Naled Technical. EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP, an impurity in Naled, as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential.". IARC lists DDVP (Dichlorvos) as being possibly carcinogenic to humans (Group 2B). Based on the results of testing in mice, the IARC has recently classified Naphthalene, a component of the solvent used for this formulation, as being possibly carcinogenic to humans (Group 2B). **CARE SHOULD BE EXERCISED IN HANDLING THIS FORMULATION.**

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Preexisting conditions which lower cholinesterase levels increase vulnerability to cholinesterase depression. These include: (for plasma) genetic cholinesterase deficiency; advanced liver disease; chronic alcoholism; malnutrition; dermatomyositis; existing toxicity from exposure to carbon disulfide; benzalkonium salts, organic mercury compounds, ciguatoxins or solanines; and (for RBC) hemolytic anemias.

---

### **4. FIRST AID MEASURES**

**TRUMPET® CONTAINS A CHOLINESTERASE INHIBITOR (NALED). A PHYSICIAN SHOULD BE CONTACTED IN ALL CASES OF EXPOSURE TO NALED AND ITS FORMULATIONS. THIS PRODUCT IS CORROSIVE TO EYES AND SKIN.**

**EYES:** Immediately flush the eyes with copious amounts of clear, cool running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. Contact a physician immediately. If there will be a delay in getting medical attention, rinse the eyes for at least another 15 minutes.

**INHALATION:** Remove victim to fresh air. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration. If breathing is difficult, give oxygen. Contact a physician immediately.

**INGESTION:** DO NOT induce vomiting. If victim is conscious, administer an 8 oz. glass of water containing 2 tbsp. activated charcoal. Have person lie on their left side to slow down absorption of the ingested material. Never give anything by mouth to an unconscious person. Contact a physician immediately.

**SKIN:** Immediately flush all affected areas with large amounts of clear water for at least 15 minutes. Remove contaminated clothing. Do not attempt to neutralize with chemical agents. Wash clothing before reuse. Contact a physician immediately.

**NOTE TO PHYSICIANS:** This is an Organophosphate (OP) Insecticide. Do not wait for laboratory confirmation to treat patients with strong clinical evidence of poisoning. In the USA and other countries, contact your local or national poison control center for more information.

**AMVAC CHEMICAL CORPORATION**  
**TRUMPET® EC Insecticide**

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**4. FIRST AID MEASURES, cont'd**

**Do Not** handle the patient without the following protective equipment in place: chemical resistant gloves and apron (preferably nitrile). Remove contaminated clothing and do not reuse without thorough cleaning with detergent and hot water. Dispose of heavily contaminated clothing, including shoes, as a hazardous waste.

Establish airway and oxygenation. IV Atropine sulfate is the antidote of choice. Moderately severe poisoning: use 0.4-2.0 mg in adults or 0.05 mg/kg in children. Repeat every 15 minutes until atropinization is achieved. Severe poisoning may require larger doses. Cholinergic toxicity may recur as atropinization wears off; monitor patient closely. Draw blood for RBC and plasma cholinesterase. In addition, Pralidoxime (2-PAM) is indicated during the first 36 hours in severe poisonings. Slow IV administration (no less than 2 minutes) of 1 g in adults or 20-50 mg/kg in children may be repeated in 1 to 2 hours if muscle weakness, twitching, and/or respiratory depression persist. Avoid morphine, aminophylline, phenothiazines, reserpine, furosemide and ethacrynic acid.

Bathe and shampoo contaminated skin and hair. If ingested, empty stomach. Due to the presence of aromatic solvents, gastric lavage should be considered following intubation with a cuffed endotracheal tube to prevent aspiration of vomitus. Activated charcoal is useful to further limit absorption.

---

**5. FIRE FIGHTING MEASURES**

**FLAMMABLE PROPERTIES**

Flash Point: 174°F (Closed cup)

Autoignition Temperature: No data available

Flammable Limits:

Lower flammable limit: No data available

Upper flammable limit: No data available

Flammability: This is a combustible liquid that will burn when heated (NFPA rating = 2)

**EXPLOSIVITY**

Mechanical Impact: Not explosive

Static Discharge: Will not occur

**HAZARDOUS COMBUSTION PRODUCTS:** This product will emit toxic fumes when burned, including hydrogen chloride, hydrogen bromide, phosphorous oxides and carbon monoxide. Vapors of the unburned product are also hazardous. Contact with the fumes and vapors should be avoided.

**EXTINGUISHING MEDIA:** Foam, dry chemical, carbon dioxide, water spray (fog).

**FIRE FIGHTING INSTRUCTIONS:** Evacuate nonessential personnel from the area. Keep upwind. Wear self-contained breathing apparatus and full bunker gear. Clean all clothing before reuse.

---

## **6. ACCIDENTAL RELEASE MEASURES**

**GENERAL:** Evacuate personnel and thoroughly ventilate the area. Use adequate ventilation and appropriate personal protective equipment (PPE, Section 8). Keep bystanders upwind and away from the spill.

**SMALL SPILL:** Cover with nonflammable absorbent (clay, sand, oil dry, kitty litter, etc.) to absorb the liquid. Sweep into an open plastic drum. Decontaminate the area and equipment with dilute alkali or ammonia (less than 5% solution) and detergent. Flush the area with water. Absorb and sweep into the same open plastic drum. Close the drum and dispose of as a hazardous waste.

**LARGE SPILL:** Dike the spill to prevent contamination of local water sources. Siphon the majority of the liquid into drums for use or disposal, depending on the circumstances. Clean the area as described for a small spill.

---

## **7. HANDLING AND STORAGE**

**HANDLING:** Prevent skin contact. Do not breathe fumes. Wear appropriate personal protective equipment. (See Section 8) Wash thoroughly and change clothes after handling. Keep product away from food drink, cosmetics, and tobacco products. See product label for more detailed handling procedures.

**STORAGE:** Do not contaminate water, food or feed by storage or disposal. Store product in a cool, dry, locked place out of reach of children. Store in original container.

---

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**ENGINEERING CONTROLS:** A well-ventilated area is recommended for handling TRUMPET®. Use of mechanical or local exhaust systems is recommended.

**RESPIRATORY PROTECTION:** When respiratory protection is required, or concentrations may exceed the PEL, use a NIOSH/MSHA approved air-purifying respirator equipped with new organic vapor cartridges or canisters. A maximum use of eight hours is recommended. For emergency and other conditions where the exposure limit may be greatly exceeded, use an approved positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

**SKIN PROTECTION:** Prevent skin contact. Chemical resistant gloves (preferably nitrile), body covering clothing that has long sleeves and long pants, and chemical resistant shoes or boots, are required to prevent skin contamination. Replace gloves every eight hours or sooner if exposure has been heavy. A chemical resistant apron will provide additional protection when there is a risk of spillage or splashing. Wear clean clothes daily. Wash soiled clothes separately from other laundry. Wash thoroughly after handling this product. See the label for more specific instructions.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION, cont'd**

**EYE PROTECTION:** Safety glasses should be worn whenever working with chemicals. Goggles or a faceshield should be used if there is a chance of mist formation or splashing.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Physical State:</b>	Liquid
<b>Appearance:</b>	A clear amber liquid
<b>Odor:</b>	Aromatic solvent odor
<b>Odor Threshold:</b>	No data available
<b>Boiling Point:</b>	320°F/160°C
<b>Freezing/Melting Point:</b>	60°F/15°C
<b>Specific Gravity(Typical range):</b>	1.67 @ 25°C/4°C (77°F/39°F)
<b>Density:</b>	13.9 lb/gal
<b>Vapor Pressure (mm/Hg):</b>	10 mm Hg @ 100°F
<b>Vapor Density:</b>	Heavier than air
<b>Percent Volatile by Vol:</b>	27.5%
<b>Solubility in Water:</b>	Emulsifies
<b>Solubility (Other):</b>	This product is soluble in aromatic hydrocarbons, chlorinated hydrocarbons, ketones, and esters.
<b>Partition Coefficient (O/W):</b>	approx. 100 (a.i.) at ambient temperatures
<b>pH:</b>	3.6 (1% Dilution in water)
<b>Evaporation Rate:</b>	Not available

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**10. STABILITY AND REACTIVITY**

**CHEMICAL STABILITY (Conditions to avoid):** This product is stable under normal use and storage conditions. It may be photochemically reactive.

**INCOMPATIBILITY:** Unstable in the presence of iron or alkaline media. Corrosive to iron, aluminum and magnesium. Hydrolyzes slowly under neutral or acid conditions.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Heating product to decomposition will cause emission of acrid smoke and fumes of hydrogen chloride, hydrogen bromide, phosphorous oxides, carbon oxides and unknown organic compounds.

**HAZARDOUS POLYMERIZATION:** This product will not polymerize.

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## **11. TOXICOLOGICAL INFORMATION**

Data for ingestion, inhalation, dermal and sensitization are from a similar formulation, DIBROM 8 Emulsive. The irritation data are from testing on this formulation. The rest of the toxicological data are from Naled Technical.

<b>INGESTION:</b>	Oral LD <sub>50</sub> (rat):	235 mg/kg (female) (Toxicity Category II)
<b>INHALATION:</b>	Inhalation LC <sub>50</sub> (rat):	1.51/>2.07 (male/female, 4 hr, nose only) (Toxicity Category III)
<b>DERMAL:</b>	Skin LD <sub>50</sub> (rabbit):	5050/>5050 mg/kg (female/male) (Toxicity Category IV)
<b>IRRITATION:</b>	Eye irritation:	Extremely Irritating (Toxicity Category I)
	Skin irritation:	Corrosive (Toxicity Category I)
<b>SENSITIZATION:</b>	Skin sensitization: (Mouse Local Lymph Node)	Not a sensitizer

**CORROSIVENESS (DOT):** A study with Naled Technical showed that it is considered non-corrosive by DOT criteria when applied to the intact skin of albino rabbits.

**TERATOGENICITY:** Maternal toxicity in rats was observed at 40 mg/kg/day (body weight loss, tremors, painful or difficult breathing, and decreased activity) using Naled Technical (a.i.). No developmental effects were observed at this dose level. The maternal NOEL was 10 mg/kg/day. The developmental NOEL was 40 mg/kg/day.

**REPRODUCTIVE TOXICITY:** In a two-generation rat reproduction study with Naled Technical (a.i.), a decrease in male body weight gain was observed at 18 mg/kg/day; however, no effects on reproduction were found in adult animals. Decreases in offspring survival, number of pups born and decreased pup weights were noted at 18 mg/kg/day. The NOEL for both adults and offspring was 6 mg/kg/day.

**MUTAGENICITY:** No evidence of mutagenicity activity in *in vitro* and *in vivo* tests, using Naled Technical (a.i.).

**CARCINOGENICITY:** No evidence of carcinogenicity in laboratory animals with Naled Technical. However, EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP, an impurity in Naled, as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential". Based on the results of testing in mice, the IARC has recently classified Naphthalene, a component of the solvent used for this formulation, as being possibly carcinogenic to humans (Group 2B).

**TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** No data available.

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## **12. ECOLOGICAL INFORMATION**

**GENERAL:** This product is toxic to fish, birds, and other wildlife. Keep out of any body of water. Do not contaminate water when disposing of equipment washwaters or wastes.

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**AMVAC CHEMICAL CORPORATION  
TRUMPET® EC Insecticide**

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**13. DISPOSAL CONSIDERATIONS**

**WASTE DISPOSAL:** Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed by use according to label instructions, contact your nearest State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance. Open dumping is prohibited.

**CONTAINER DISPOSAL:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke. Contact your nearest State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance. Open dumping is prohibited.

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**14. TRANSPORTATION INFORMATION**

<b>DOT Class:</b>	6.1
<b>CANADA Shipping Class:</b>	6.1
<b>ADR Class (road):</b>	6.1
<b>AUSTRALIAN Shipping Class:</b>	6 Subsection 111
<b>UN Number:</b>	UN3018
<b>IMDG Class (sea):</b>	6.1
<b>IATA Class (air):</b>	6.1
<b>Marine Pollutant:</b>	Yes
<b>Packing Group:</b>	III
<b>Hazard Label(s):</b>	TOXIC
<b>Proper Shipping Name(s):</b>	Organophosphorus pesticides, liquid, toxic (Naled)
<b>Reportable Quantity:</b>	Yes
<b>(DOT, 172.101, Appendix A)</b>	

**PACKAGING**

**General Description:** 30 gal polyethylene drums

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**15. REGULATORY INFORMATION**

**U.S. FEDERAL REGULATIONS:** This product is registered under EPA/FIFRA Regulations. It is a violation of Federal Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

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TRUMPET® EC Insecticide**

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**15. REGULATORY INFORMATION, cont'd**

**SARA TITLE III DATA**

**Section 311 & 312 Hazard Categories:**

Immediate Health Hazard:	Yes
Delayed Health Hazard:	Yes
Fire Hazard:	Yes
Reactive Hazard:	No
Sudden Pressure Release Hazard:	No

**Section 302 Extremely Hazardous Substances:** DDVP (Dichlorvos, 62-73-7)

**Section 313 Toxic Chemicals:** Naled (300-76-5); DDVP (Dichlorvos, 62-73-7);  
Naphthalene (91-20-3)

**CERCLA /EHS Reportable Quantity (RQ):** DDVP (Dichlorvos) - 10 lbs; Naled - 10 lbs;  
Naphthalene - 100 lb; Product (calc'd) - 15 lbs

**STATE REGULATIONS:**

**CALIFORNIA (Proposition 65):** This product contains chemicals known to the State of California  
to cause cancer - DDVP and Naphthalene.

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**16. OTHER INFORMATION**

**MSDS Status:**

**Date This Revision:** 12 December, 2005

**Date Previous Revision:** 19 December 2003

**Person Responsible for Preparation:** Gary A. Braden

**Reasons for Revision:** Changes have been made in sections 5, 6, 8, and 11 to correct typographical  
errors or to clarify instructions given in these sections.

**DISCLAIMER:** This information is provided for the limited guidance to the user. While AMVAC  
believes that the information is, as of the date hereof, reliable, it is the user's responsibility  
to determine the suitability of the information for its purposes. The user is advised not to  
construe the information as absolutely complete since additional information may be  
necessary or desirable when particular, exceptional, or variable conditions or circumstances  
exist (like combinations with other materials), or because of applicable regulations. No  
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is made hereunder with respect to the information or the product to which the information  
relates.

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**16. OTHER INFORMATION, cont'd**

**ABBREVIATIONS:**

a.i.	-	active ingredient
ACGIH	-	American Conference of Governmental Industrial Hygienists
ADR	-	Mark used to indicate European Approval for the Transport of Dangerous Goods by Road
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	-	Department of Transportation (USA)
EPA	-	Environmental Protection Agency
FIFRA	-	Federal Insecticide, Fungicide, and Rodenticide Act
IARC	-	International Agency for Research on Cancer
IATA	-	International Air Transport Association
IMDG	-	International Maritime Dangerous Goods
NTP	-	National Toxicology Program
OSHA	-	Occupational Safety and Health Agency
SARA	-	Superfund Amendments and Reauthorization Act
TSCA	-	Toxic Substances Control Act

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This is the last page of this MSDS. There should be 10 pages.



# Altosid<sup>®</sup>

## LIQUID LARVICIDE CONCENTRATE



**PREVENTS ADULT MOSQUITO EMERGENCE  
(INCLUDING THOSE WHICH MAY TRANSMIT WEST NILE VIRUS)**

## SPECIMEN LABEL

**ACTIVE INGREDIENT:**

(S)-Methoprene (CAS # 65733-16-6) . . . . . 20%

**OTHER INGREDIENTS:** . . . . . 80%  
Total . . . . . 100%

Formulation contains 1.72 lb/gal (205.2 g/l) active ingredient

EPA Reg No. 2724-446

KEEP OUT OF REACH OF CHILDREN

### CAUTION

SEE ADDITIONAL PRECAUTIONARY STATEMENTS

BECAUSE OF THE UNIQUE MODE OF ACTION OF A.L.L.<sup>TM</sup>, SUCCESSFUL USE REQUIRES FAMILIARITY WITH SPECIAL TECHNIQUES FOR APPLICATION TIMING AND TREATMENT EVALUATION. SEE **GUIDE TO PRODUCT APPLICATION** OR CONSULT LOCAL MOSQUITO ABATEMENT AGENCY.

### PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

### FIRST AID

Call a poison control center or doctor immediately for treatment advice.

**If in eyes** • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.

**If on skin or clothing** • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-248-7763 for emergency medical treatment information.

### ENVIRONMENTAL HAZARDS

Do not contaminate water when disposing of rinsate or equipment washwaters.

### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

### CHEMIGATION

Refer to supplemental labeling entitled "**Guide to Product Application**" for use directions for chemigation. Do not apply this product through any irrigation system unless the supplemental labeling on chemigation is followed.

### MIXING AND HANDLING INSTRUCTIONS

1. **SHAKE WELL BEFORE USING.** A.L.L. may separate on standing and must be thoroughly agitated prior to dilution.
2. Do not mix with oil; use clean equipment.

3. Partially fill spray tank with water; then add the labeled amount of **A.L.L.**, agitate, and complete filling. Mild agitation during application is desirable.
4. Use spray solution within 48 hours; always agitate before spraying.

## APPLICATIONS

**A.L.L.** must be applied to 2nd, 3rd, or 4th larval instars of floodwater mosquitoes to prevent adult emergence. Treated larvae continue normal development to the pupal stage where they die. This insect growth regulator **has no effect when applied to pupae or adult mosquitoes.** **A.L.L.** has sufficient field life to be effective at label rates when applied to larval stages under varying field conditions. For further information, see **Guide to Product Application.**

## METHODS OF APPLICATION

### AERIAL

Use the amount of **A.L.L.** listed below in sufficient water to give complete coverage. One-half to 5 gallons of spray solution per acre is usually satisfactory. Do not apply when weather conditions favor drift from areas treated.

### GROUND

Determine the average spray volume used per acre by individual operators and/or specific equipment. Mix **A.L.L.** in the appropriate volume of water to give the rate per acre shown below.

### APPLICATION RATE

Apply 3/4 to 1 fl oz of **A.L.L.** per acre (55 to 73 ml/hectare) in water as directed.

## APPLICATION SITES

### PASTURES

**A.L.L.** may be applied after each flooding without removal of grazing livestock.

### RICE

**A.L.L.** must be applied to 2nd, 3rd, and/or 4th instar larvae of mosquitoes found in rice, usually within 4 days after flooding. **A.L.L.** treatment may be repeated with each flooding.

### INTERMITTENTLY FLOODED NONCROP AREAS

Apply **A.L.L.** as directed above when flooding may result in floodwater mosquito hatch. Typical sites include: freshwater swamps and marshes, salt marshes, woodland pools and meadows, dredging spoil sites, drainage areas, waste treatment and settling ponds, ditches and other natural and manmade depressions.

### CROP AREAS

Apply **A.L.L.** to irrigated croplands after flooding to control mosquito emergence. Examples of such sites are: vineyards, rice fields (including wild rice), date palm orchards, fruit and nut orchards, and berry fields and bogs. Irrigated pastures may be treated after each flooding **without** removal of livestock.

## DENSE VEGETATION OR CANOPY AREAS

Apply an **A.L.L.** sand mixture using standard granular dispersal equipment. For detailed preparation instructions, refer to **Guide to Product Application.**

## TANK MIXING INSTRUCTIONS

**A.L.L.** may be tank mixed with liquid *Bacillus thuringiensis* variety *israeliensis* (*B.t.i.*) formulations. The ratio of *B.t.i.* to **A.L.L.** is to range from 24:1 to 50:1 (volume/volume). For example, to prepare a 50:1 tank mix, add 1 gallon of **A.L.L.** to 50 gallons of *B.t.i.* This tank mix can be applied to sites listed above at rates of 2 to 16 fluid ounces/acre (0.15–1.2 liters/hectare).

The user, at his discretion, can tank mix **A.L.L.** with an adulticide currently registered for use unless the product label prohibits such mixing. The resulting tank mixture must be used in accordance with the more restrictive label limitations and precautions.

## STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

### STORAGE

Store in a cool place away from other pesticides, food, and feed. In case of leakage or spill, soak up with sand or another absorbent material.

### PESTICIDE DISPOSAL

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

### CONTAINER DISPOSAL

Nonrefillable container. Do not reuse or refill this container. Clean container promptly after emptying. Triple rinse as follows. Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling, if available, or puncture and dispose of in a sanitary landfill, or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Seller makes no warranty, expressed or implied, concerning the use of this product other than indicated on the label. Buyer assumes all risks of use and handling of this material when such use and handling are contrary to label instructions.

Always read the label before using the product.

For information, call 1-800-248-7763

[www.altosid.com](http://www.altosid.com)

**Wellmark International**

1501 East Woodfield Road 200W  
Schaumburg, Illinois 60173



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September 2009  
Schaumburg, IL



# Altosid® PELLETS MOSQUITO GROWTH REGULATOR

A GRANULAR PRODUCT TO PREVENT ADULT MOSQUITO EMERGENCE (INCLUDING THOSE WHICH MAY TRANSMIT WEST NILE VIRUS)

## SPECIMEN LABEL

### ACTIVE INGREDIENT:

(S)-Methoprene (CAS #65733-16-6) . . . . . 4.25%

OTHER INGREDIENTS: . . . . . 95.75%

Total . . . . . 100.00%

EPA Reg No. 2724-448

EPA Est. No. 39578-TX-1

KEEP OUT OF REACH OF CHILDREN  
**CAUTION**

### PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling.

### FIRST AID

Call a poison control center or doctor for treatment advice.

- |                        |  |
|------------------------|--|
| If in eyes             | <ul style="list-style-type: none"><li>Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li><li>Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li></ul> |
| If on skin or clothing | <ul style="list-style-type: none"><li>Take off contaminated clothing.</li><li>Rinse skin immediately with plenty of water for 15-20 minutes.</li></ul>   |

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-248-7763 for emergency medical treatment information.

### ENVIRONMENTAL HAZARDS

Do not contaminate water when disposing of rinsate or equipment washwaters.

### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

### INTRODUCTION

ZÖECON® ALTOSID® Pellets (ALTOSID® Pellets) release ALTOSID® Insect Growth Regulator as they erode. ALTOSID® Pellets prevent the emergence of adult standing water mosquitoes, including *Anopheles*, *Culex*, *Culiseta*, *Coquillettidia*, and *Mansonia* spp., as well as adults of the floodwater mosquitoes such as *Aedes*, *Ochlerotatus*, and *Psorophora* spp. from treated sites.

### GENERAL DIRECTIONS

ALTOSID® Pellets release effective levels of ALTOSID® Insect Growth Regulator for up to 30 days under typical environmental conditions. Continue treatment through the last brood of the season. Treated larvae continue to develop normally to the pupal stage where they die. **NOTE:** This insect growth regulator has no effect on mosquitoes which have reached the pupal or adult stage prior to treatment.

### APPLICATION SITES AND RATES

Use lower application rates when water is shallow, vegetation and/or pollution are minimal, and insect populations are low. Use higher rates when water is deep (>2 ft), vegetation, pollution, and/or organic debris or water flow are high, and insect populations are high. In instances of high organic debris and water flow, residual activity may be diminished.

MOSQUITO HABITAT	RATE (LB/ACRE)
<b>Floodwater sites</b> Pastures, meadows, rice fields, freshwater swamps and marshes, salt and tidal marshes, cattail marshes, woodland pools, flood-plains, tires, other artificial water-holding containers	2.5–5
Dredging spoil sites, waste treatment and settling ponds, ditches and other manmade depressions	5–10
<b>Permanent water sites</b> Ornamental ponds and fountains, fish ponds, cattail marshes, water hyacinth beds, flooded crypts, transformer vaults, abandoned swimming pools, construction and other manmade depressions, treeholes, other artificial water-holding containers	2.5–5
Storm drains, catch basins, roadside ditches, cesspools, septic tanks, waste settling ponds, vegetation-choked phosphate pits	5–10

### APPLICATION METHODS

**Mosquitoes:** Apply **ALTOSID® Pellets** up to 15 days prior to flooding, or at any stage of larval development after flooding or in permanent water sites. Fixed wing aircraft or helicopters equipped with granular spreaders capable of applying rates from 2.5 to 10 lb/acre may be used to apply **ALTOSID® Pellets**. The pellets may also be applied using ground equipment which will achieve good, even coverage at the above rates. Apply **ALTOSID® Pellets** to artificial containers such as tires and catch basins, etc.

### STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal. Store closed containers of **ALTOSID® Pellets** in a cool, dry place.

### PESTICIDE DISPOSAL

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

### CONTAINER HANDLING

Nonrefillable container. Do not reuse or refill this container. Triple rinse (or equivalent). Then offer for recycling, if available, or puncture and dispose of in a sanitary landfill, or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

### WARRANTY AND CONDITIONS OF SALE

Seller makes no warranty, expressed or implied, concerning the use and handling of this product other than indicated on the label. Buyer assumes all risks of use and handling of this material when such use and handling are contrary to label instructions.

For information or in case of an emergency, call **1-800-248-7763**.

**[www.altosid.com](http://www.altosid.com)**

**Wellmark International**  
1501 East Woodfield Road 200W  
Schaumburg, Illinois 60173



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# Where Weeds and Water Meet

AquaMaster™ Keeps Weeds at Bay



**AQUAMASTER™**  
Herbicide by Monsanto

Anywhere weeds and water meet, there's a strong chance that vegetation management problems will grow like weeds. And anyone who manages aquatic areas knows that when weeds are left unchecked, they can create hard-to-resolve problems:

- **Block water channels.** Light infestations of emerged weeds can spread rapidly. Weeds can obstruct boat traffic, hinder irrigation and lead to silt buildup.
- **Breed health hazards.** Unmanaged aquatic sites can become breeding sites for insects, such as mosquitoes. Weeds can impede conventional insect control methods.
- **Become unsightly and unpleasant.** Weeds simply make water less enjoyable, from decaying plant odor to reduced property values to decreased shoreline access.
- **Obstruct sight lines.** Emerged weeds can obstruct sight distances along roads, reducing motorist safety.
- **Challenge weed management.** Emerged weeds tend to thrive in areas that are difficult to reach using mechanical or physical control methods.

#### AquaMaster Surfaces as Top Choice

AquaMaster herbicide solves weed problems with convenient, broad-spectrum control.

AquaMaster is an excellent fit for golf courses, residential and commercial areas and in municipalities, roadside areas and irrigation districts.

AquaMaster works in most aquatic settings better than other options because of its application flexibility.



#### Unmatched Weed Control

AquaMaster is a non-selective aquatic herbicide that controls emerged vegetation in and around all bodies of fresh and salt water, whether the waters are flowing or stagnant.

AquaMaster is effective in lakes, rivers, streams, ponds, seeps, irrigation and drainage ditches, canals, reservoirs and similar sites.

AquaMaster is highly effective on more than 190 species of emerged weeds, including a wide range of annual and perennial grasses, broadleaf weeds and sedges. No other herbicide can surpass that performance on so many emerged weeds, and at the same time virtually eliminate the need for mechanical or physical control methods.

Where some herbicides may provide only a temporary burndown of top vegetation, AquaMaster is absorbed by plant foliage and moves throughout plant tissues to control the entire plant, from leaf tips to roots. The active ingredient in AquaMaster interrupts the activity of the plant enzyme needed for the production of essential amino acids.

#### AquaMaster's Flexibility Runs Deep

AquaMaster has a wide range of labeled uses and no water use restrictions, when used according to label directions. Managers have the flexibility to use AquaMaster in public, agricultural, residential or commercial areas—virtually anywhere weeds and water meet, as long as labeled rates and applications are followed.

AquaMaster has proven its success in cost-effectively managing vegetation in and around streams and ditches, and can remove potential litter catching brush in ditch banks without sterilizing the soil. That allows native grasses and wildflowers to grow and helps prevent erosion.

AquaMaster can also reduce weed pulling and string trimmer use, and can maintain sculpted water's edges at golf courses and resorts without heavy equipment or dredging.

Monsanto can meet terrestrial and aquatic weed control needs. Flexibility makes AquaMaster the aquatic tool of choice in your herbicide line-up when it comes to managing industrial, turf and ornamental weed control requirements.

#### Favorable Environmental Characteristics

AquaMaster's favorable environmental characteristics are well documented in more than 30 years of research involving the active ingredient, glyphosate. In fact, environmental information generated about glyphosate is among the most extensive available for any herbicide on the market today.

Glyphosate, the active ingredient in AquaMaster herbicide, is non-volatile, which eliminates the risk of vapors damaging non-target vegetation. Also, there are no odors to disturb the surrounding public.

After applying AquaMaster according to label directions, there are no restrictions on water use for irrigation, recreation or domestic purposes. Laboratory experiments indicate that glyphosate dissipates readily from water by binding tightly to suspended soil particles, through deposition in bottom sediment and microbial degradation.

Glyphosate has rarely been detected in drinking water, and has never been found at concentrations exceeding the U.S. EPA's drinking water standard. And, since glyphosate dissipates readily in water, crops irrigated with water from areas treated with AquaMaster will not be adversely affected.

#### Favorable Toxicological Characteristics

Laboratory studies in animals show AquaMaster has favorable toxicological characteristics. No credible evidence exists that glyphosate, the active ingredient, causes cancer, mutations, nerve damage or birth defects. In fact, the U.S. EPA, based on long-term toxicological tests, has classified glyphosate as Category E for evidence of non-carcinogenicity in humans—the most favorable cancer rating for pesticide active ingredients and one that few other products meet.

Results from acute toxicological studies are shown below for AquaMaster. Results of single-exposure oral, dermal and inhalation tests required by the U.S. EPA are expressed by the LD<sub>50</sub>/LC<sub>50</sub><sup>1</sup> values. The smaller the value, the greater the toxicity. The EPA then uses these values to place pesticides into one of four toxicity categories, with I being most toxic, and IV being least toxic. AquaMaster falls into the least toxic category, with its oral and dermal LD<sub>50</sub>s of >5,000 mg/kg.



Where weeds  
and water meet,  
AquaMaster is  
the choice of  
aquatic area  
managers.

#### Acute Toxicity Data: AquaMaster™ Herbicide

Exposure Route	Species	LD <sub>50</sub> /LC <sub>50</sub> <sup>1</sup>	EPA Category <sup>2</sup>	EPA Classification
Oral LD <sub>50</sub>	Rat	>5,000 mg/kg	IV	Practically nontoxic
Dermal LD <sub>50</sub>	Rabbit	>5,000 mg/kg	IV	Practically nontoxic
Inhalation LC <sub>50</sub>	Rat	>4.98 mg/L	IV	Practically nontoxic
Eye Irritation	Rabbit		IV	Essentially non-irritating
Skin Irritation	Rabbit		IV	Essentially non-irritating
(No skin allergy was observed in guinea pigs following repeated skin exposure.)				

<sup>1</sup> The LD<sub>50</sub>/LC<sub>50</sub> is the dose or concentration that produces 50% mortality in the test organisms.

<sup>2</sup> The U.S. Environmental Protection Agency has established acute toxicity categories ranging from slight to severe with Category I being severe and Category IV being slight.



For broad-spectrum,  
responsible and con-  
venient weed control,  
AquaMaster always  
surfaces at the top.

Studies on mammals, fish and birds indicate that glyphosate does not bioaccumulate in the food chain. Glyphosate is highly water-soluble and is rapidly eliminated from the body. Test results show it has not been found to accumulate in test species, even after repeated exposure.

AquaMaster and glyphosate have low acute toxicity to aquatic organisms, as shown below. Surfactants that might be mixed with AquaMaster can have low to moderate acute toxicity to aquatic organisms. However, the toxicity and exposure is sufficiently low that there is no significant risk of unreasonable adverse effects to aquatic organisms under normal use conditions.



Where weeds and water meet, AquaMaster is the choice of aquatic area managers. For broad-spectrum, responsible and convenient weed control, AquaMaster always surfaces at the top.

#### Aquatic Toxicity Data: AquaMaster Herbicide and glyphosate

Species, Test Duration	LC <sub>50</sub> or EC <sub>50</sub> <sup>1</sup> (mg/L)	EPA Classification
<b>AquaMaster herbicide</b>		
Bluegill sunfish, 96-hr LC <sub>50</sub>	>1,000	Practically nontoxic
Rainbow trout, 96-hr LC <sub>50</sub>	>1,000	Practically nontoxic
Daphnia magna, 48-hr EC <sub>50</sub>	930	Practically nontoxic
Green algae, 72-hr (growth) EC <sub>50</sub>	166	Practically nontoxic
<b>Glyphosate (active ingredient)</b>		
Sheepshead minnow, 96-hr LC <sub>50</sub>	>1,000	Practically nontoxic
Grass shrimp, 96-hr LC <sub>50</sub>	281	Practically nontoxic
Mysid shrimp, 96-hr LC <sub>50</sub>	>1,000	Practically nontoxic
Sea urchin, 96-hr LC <sub>50</sub>	>1,000	Practically nontoxic
Fiddler crab, 96-hr LC <sub>50</sub>	934	Practically nontoxic

<sup>1</sup> The EC<sub>50</sub> is the concentration that produces effects (inhibition of growth or immobilization) in 50% of the test organisms.



**RESTRICTED USE PESTICIDE**

DUE TO EYE AND SKIN CORROSIVITY HAZARD

For retail sale to and use only by Certified Applicators, or persons under their direct supervision, and only for those uses covered by the Certified Applicators Certification.

**INSECTICIDE**

FOR USE ONLY BY FEDERAL, STATE, TRIBAL, OR LOCAL GOVERNMENT OFFICIALS RESPONSIBLE FOR PUBLIC HEALTH OR VECTOR CONTROL, OR BY PERSONS CERTIFIED IN THE APPROPRIATE CATEGORY OR OTHERWISE AUTHORIZED BY THE STATE OR TRIBAL LEAD PESTICIDE REGULATORY AGENCY TO PERFORM ADULT MOSQUITO CONTROL APPLICATIONS, OR BY PERSONS UNDER THEIR DIRECT SUPERVISION. NOT FOR USE IN AND AROUND THE HOME BY HOMEOWNERS OR PROFESSIONAL APPLICATORS.

**ACTIVE INGREDIENT:**

Naled (1,2-dibromo-2,2-dichloroethyl dimethyl phosphate) . . . . .	78.0%
<b>INERT INGREDIENTS:</b> . . . . .	22.0%
<b>TOTAL</b> . . . . .	100.0%

Contains 10.8 pounds Naled per gallon.

Contains petroleum distillates

## **KEEP OUT OF REACH OF CHILDREN**

## **DANGER / PELIGRO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

<b>FIRST AID</b>	
Organophosphate	
<b>If in eyes:</b>	<ul style="list-style-type: none"> <li>Hold eye open and rinse slowly and gently from the side of the eye with water for 15-20 minutes.</li> <li>Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If on skin or clothing:</b>	<ul style="list-style-type: none"> <li>Take off contaminated clothing.</li> <li>Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If Swallowed:</b>	<ul style="list-style-type: none"> <li>Call a poison control center or doctor immediately for treatment advice.</li> <li>Have person sip a glass of water if able to swallow.</li> <li>Do not induce vomiting unless told to do so by a poison control center or doctor.</li> <li>Do not give anything by mouth to an unconscious person.</li> </ul>
<b>If Inhaled:</b>	<ul style="list-style-type: none"> <li>Move person to fresh air.</li> <li>If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth unless individual is contaminated with product.</li> <li>Call a poison control center or doctor for further treatment advice.</li> </ul>
<b>EMERGENCY INFORMATION</b>	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
FOR THE FOLLOWING EMERGENCIES, PHONE 24 HOURS A DAY:	
Transportation Only: CHEMTREC.....	1-800-424-9300
All Other: AMVAC.....	1-323-264-3910

**NOTE TO PHYSICIAN**

Naled is an Organophosphate cholinesterase inhibitor. Contains petroleum distillates. Measurement of blood cholinesterase activity may be useful in monitoring exposure. If signs of cholinesterase inhibition appear, atropine sulfate is antidotal. 2-PAM (Protapam) is also antidotal and may be used in conjunction with atropine, but should not be used alone. Probable mucosal damage may contraindicate the use of gastric lavage. May pose an aspiration pneumonia hazard.

**PRECAUTIONARY STATEMENTS****HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

**DANGER. CORROSIVE.** Causes irreversible eye and skin damage. Causes skin burns. May be fatal if swallowed. Harmful if inhaled or absorbed through the skin. Do not get in eyes, on skin, or on clothing. Do not breathe vapor or spray mist. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Some materials that are chemical-resistant to this product are Barrier laminate, Butyl Rubber, Nitrile Rubber, and Viton.

EPA REG. NO. 5481-481

EPA EST. NO. 5481-CA-1

EPA EST. NO. 5481-AL-1



4100 E. Washington Blvd.

Los Angeles, CA 90023, USA

1-323-264-3910 • www.amvac-chemical.com

**NET CONTENTS:  
AS MARKED ON CONTAINER**

Mixers, loaders, applicators, and other handlers must wear:

- Protective eye wear (goggles, face shield, or safety glasses)
- Long-sleeved shirt and long pants
- Socks plus shoes
- Chemical-resistant gloves (barrier laminate, butyl rubber, nitrile rubber, or viton, selection category E) and apron when mixing or loading

See engineering controls for additional requirements.

Mixers, loaders, applicators and other handlers engaged in those handler activities for which use of an engineering control is not possible, such as cleaning up a spill or leak and cleaning or repairing contaminated equipment, must wear:

- Protective eye wear (goggles, face shield, or safety glasses)
- Coveralls over long-sleeve shirt and long pants
- Chemical-resistant gloves
- Chemical-resistant footwear plus socks
- Chemical-resistant apron if exposed to the concentrate
- Chemical-resistant headgear for overhead exposure
- A respirator with an organic-vapor removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23G), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH-approved respirator with an organic vapor (OV) cartridge or canister with any R, P, or HE prefilter. Please note that N designation for respirator filters does not apply when application is made with oils.

**USER SAFETY REQUIREMENTS**

- Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water.
- Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

**ENGINEERING CONTROLS**

- Mixers and loaders supporting aerial or mechanical ground applications must use a closed system designed by the manufacturer to enclose the pesticide to prevent it from contacting handler or other people **AND** the system must be functioning properly and must be used and maintained in accordance with the manufacturer's written operating instructions.
- The system must be capable of removing the pesticide from the shipping container and transferring it into mixing tanks and/or application equipment.
- At any disconnect point, the system must be equipped with a dry disconnect or dry couple shut-off device that is warranted by the manufacturer to minimize drippage to not more than 2 mL per disconnect point.

In addition, mixers and loaders must:

- Wear the PPE required above for mixers and loaders
- Have immediately available for use in an emergency, such as a broken package, spill, or equipment breakdown the PPE specified above for handlers engaged in those activities for which use of an engineering control is not possible
- If the system operates under pressure, protective eyewear must be worn

Applicators must:

- Use an enclosed cab/cockpit and must wear the PPE required in the PPE section of this labeling for applicators.
- Be provided and have immediately available for use in case of an emergency repair of the application equipment, the PPE specified in the PPE section of this labeling for handlers engaged in those activities for which use of an engineering control is not possible.
- Take off any PPE that was contaminated before entering reentering the cab/cockpit.
- Store all such PPE in a closed, chemical-resistant container, such as a plastic bag, to prevent contamination of the inside of the cab/cockpit.

In addition, motorized ground-equipment applicators must:

- Use an enclosed cab with a nonporous barrier that totally surrounds the occupant and prevents contact with pesticides outside the cab. The cab must either have a properly functioning ventilation system that is used and maintained according to the manufacturer's written operating instructions and is declared in writing by the manufacturer or by a governmental agency to provide at least as much protection as the type of respirator listed in the PPE section above **OR** the occupant must wear a respirator as specified in the PPE section above.

### User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

It is recommended that any worker displaying clinical signs of cholinesterase-inhibition, such as headaches, nausea, and dizziness have an immediate physical examination including appropriate cholinesterase measurements. If initial examination was not conducted by a board-certified person who is certified in occupational health, then a separate examination should be conducted within 24 hours by a person so certified.

### ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish, aquatic invertebrates, and wildlife. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates. Before making the first application in a season, consult with the primary State agency responsible for regulating the pesticides to determine if permits are required or regulatory mandates exist. Do not apply over bodies of water (e.g., lakes, swamps, rivers, permanent streams, natural ponds, commercial fish ponds, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material away from the water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment washwaters or rinsate.

This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. To minimize hazard to bees, it is recommended that the product is not applied more than two hours after sunrise or two hours before sunset, limiting application to times when bees are least active. Do not apply this product or allow it to drift to blooming crops or weeds while bees are visiting the treatment area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or the tribe during a natural disaster recovery effort.

### DIRECTIONS FOR USE

Before making the first application of the season, consult with the primary State agency responsible for regulating the use of pesticides to determine if permits are required or regulatory mandates exist.

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

**READ ENTIRE LABEL, USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.**

#### TANK MIXES

**NOTICE:** Tank mixing or use of this product with any other product shall be the exclusive risk of user, applicator and/or application advisor. Read and follow the entire label of each product to be used in the tank mix with this product.

TRUMPET EC is a special formulation for use undiluted to be applied for the control of mosquitoes, flies and certain other nuisance insects.

#### APPLICATION RESTRICTIONS

For application by, or under the supervision of, personnel certified/trained in public health pest control or mosquito control. For each application, a record must be kept of:

- Date, time and areas where application occurred
- Type and size of spray nozzle used
- Dilution and application rate
- Speed of application vehicle (whether air or ground)
- A description of insecticide delivery system used for the specific application
- Climate factors (e.g., ambient temperature, wind speed/direction) as determined using a reliable means
- Employees involved in mixing, loading and applying TRUMPET EC

These records must be kept by the responsible public agency or their designee for a minimum of two years using storage methods that will allow the records to be easily retrieved.

Any system used to apply this product must be capable of providing the correct droplet size as specified below. Likewise, all applications must use the correct droplet size as specified below. Careful attention to directions concerning nozzles, nozzle positioning, air speed and droplet size is essential to avoid unwanted effects. Under-atomization produces large droplets that will quickly fall to the ground, while over-atomization produces finer droplets which either evaporate, dissipate, or drift in an unanticipated manner. Correct droplet size is critical to ensure effective mosquito control.

The entire spray system must be inspected before each operation to correct any leaks or obstructions, to detect whether the nozzle, hoses, or other parts are worn and need replacement, to ensure that the flow is properly calibrated and to determine that adequate pressure is being maintained. Adequate cleaning and maintenance of unit must be performed to ensure that the entire system is operating properly. Spray system components essential for correct droplet size must be cleaned or replaced as needed to ensure correct droplet size.

Spray during periods when wind speed is between 1 and 15 mph at ground level and when thermal activity is low. Do not apply when ambient temperature is less than 50°F.

Do not apply when it is raining in the treatment area.

Treatment of a site must be based on pest surveillance results. Do not treat any site more than 1 time per day. Do not treat any site with more than 2 fl. oz. of undiluted TRUMPET EC per acre within a 7 day period and the amount of undiluted TRUMPET EC applied to any site should not exceed 127 fl. oz. (10.73 pounds per acre of naled a.i./acre) per year. More frequent treatments may be made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

#### Ground-Based Application:

Spray equipment must be adjusted so that the volume median diameter (VMD) is less than 40 microns ( $D_v 0.5 < 40 \mu\text{m}$ ) and that 90% of the spray is contained in droplets smaller than 75 microns ( $D_v 0.9 < 75 \mu\text{m}$ ). Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

#### Aerial Application:

Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns ( $D_v 0.5 < 60 \mu\text{m}$ ) and that 90% of the spray is contained in droplets smaller than 115 microns ( $D_v 0.9 < 115 \mu\text{m}$ ). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

#### OPERATIONAL USE INSTRUCTIONS

- All equipment used in the mixing or application (by ground or air) of TRUMPET EC must be constructed of corrosion-resistant materials. Stainless steel, bronze, brass, fiberglass, polypropylene and rigid PVC have all proven to be adequately resistant to the effects of TRUMPET EC when properly maintained and inspected.
- Use of Teflon or Viton seals is recommended. Even when these materials are used to construct a spray system, a careful maintenance program involving flushing, cleansing and constant inspection must be followed. Avoid use of steel or galvanized steel.
- Strain TRUMPET EC as it is being loaded. Use a 100 mesh stainless steel or nylon screen. If product crystallization occurs, warm at 70°F until crystals disappear.
- Flushing the system following application is required. Use water to thoroughly flush the entire spray system following application of TRUMPET EC.
- TRUMPET EC must be applied using the correct droplet size. Over-atomization produces finer droplets which either evaporate or dissipate too quickly and become unavailable for mosquito contact. The spread factor for TRUMPET EC on silicone or Teflon-coated slides is 0.54 and 0.7, respectively. If applied incorrectly, TRUMPET EC will spot certain automobile paint finishes. Careful attention to recommendations concerning nozzles, nozzle positioning, air speed and droplet size is essential to avoid paint spotting.

#### ADULT MOSQUITO CONTROL

**Adult Mosquito Control in Residential Areas, Municipalities, Tidal Marshes, Swamps, Woodlands, and Agricultural Areas (when applied in wide-area public pest control programs sponsored by governmental entities):** It is not necessary to avoid farm buildings, dairy barns, pastures, feed or forage areas. Use in agricultural areas must be in a manner as to ensure that residues do not exceed the established federal tolerance for the active ingredient in or on raw agricultural commodities resulting from use for wide area pest control. Treat shrubbery and vegetation where mosquitoes may be present. Shrubbery and vegetation around stagnant pools, marshy areas, swamps, residential areas, municipalities, woodlands, pastures, farm buildings and feedlots may be treated.

**Ultra Low Volume (ULV) Aerial Application:** Apply 0.6 to 1.2 fl. oz. of undiluted product per acre (equivalent to 0.05 to 0.1 lb. a.i./acre). Use the 1.2 fl. oz. rate where heavy vegetation exists; i.e., woodlands, etc.

**Ultra Low Volume (ULV) Ground Application:** Apply TRUMPET EC undiluted at a rate of 0.75 fl. oz. per minute at 5 mph; 1.5 fl. oz. per minute at 10 mph; and 2.2 fl. oz. per minute at 15 mph, applying a 300 ft. swath. These flow rates are equivalent to 0.02 lb. active per acre. In conditions of high pest pressure and/or heavy foliage, a maximum of 0.1 lb. active per acre may be applied.

Vehicles used to apply TRUMPET EC must be kept closed during application (air-conditioned) and equipped with an automatic flow control device. Consult equipment manufacturers for specific recommendations.

## **HOUSEFLIES, GNATS, CERTAIN OTHER NUISANCE INSECTS AND SUPPRESSION OF BLACKFLIES**

**Small Flying Moths, Flies (including but not limited to Crane Flies, Adult Stable Flies, Dog Flies, Biting Flies, Filth Flies), Midges in Residential Areas, Municipalities, Tidal Marshes, Swamps, Woodlands, and Agricultural Areas (when applied in wide-area public pest control programs sponsored by governmental entities):** It is not necessary to avoid farm buildings, dairy barns, and feed or forage areas.

**Ultra Low Volume (ULV) Aerial Application:** Apply 1.2 fl. oz. of undiluted TRUMPET EC per acre (equivalent to 0.1 lb. a.i./acre).

## **SUPPRESSION OF DEER FLIES AND OTHER TABINIDS**

**Deer Flies in Residential Areas, Municipalities, Tidal Marshes, Swamps, Woodlands, and Agricultural Areas (when applied in wide-area public pest control programs sponsored by governmental entities):** It is not necessary to avoid farm buildings, dairy barns, and feed or forage areas.

**Ultra Low Volume (ULV) Aerial Application:** Apply 1.2 fl. oz. of undiluted TRUMPET EC per acre (equivalent to 0.1 lb. a.i./acre).

### **STORAGE AND DISPOSAL**

**PROHIBITIONS:** Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Open dumping is prohibited.

**STORAGE:** Keep pesticides in original container. Do not put concentrate into, or dilute into food or drink containers. For help with any spill, leak, fire or exposure involving this material, call day or night 1-323-264-3910.

**PESTICIDE DISPOSAL:** This product is acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

#### **CONTAINER REUSE:**

**RETURNABLE CONTAINER:** This container is a dedicated, single-product returnable container. Return empty container to seller at location designated by seller as a collection point. Do not break seals, add anything to container or open container after use. Do not rinse or contaminate empty container. Do not dispose of untampered empty container or use it for any other purposes. Any evidence of broken seals or other tampering or adding anything to the container renders it unfit for return. In such case, it is the obligation of the holder of the container to dispose of it properly.

**It is required that this product be used in a CLOSED SYSTEM. This container may require a tank adapter. For questions regarding tank adapters, call AMVAC Customer Service at 1-888-462-6822 (1-888-GO-AMVAC).**

### **LIMITED WARRANTY AND DISCLAIMER**

The manufacturer warrants (a) that this product conforms to the chemical description on the label; (b) that this product is reasonably fit for the purposes set forth in the directions for use, subject to the inherent risks referred to herein, when it is used in accordance with such directions; and (c) that the directions, warnings, and other statements on this label are based upon responsible experts' evaluations of reasonable tests of effectiveness, of toxicity to laboratory animals and to plants and residues on food crops, and upon reports of field experience. Tests have not been made on all varieties of food crops and plants, or in all states or under all conditions.

**TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE SET FORTH HEREIN. THE MANUFACTURER NEITHER MAKES NOR INTENDS, NOR DOES IT AUTHORIZE ANY AGENT OR REPRESENTATIVE, TO MAKE ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, AND IT EXPRESSLY EXCLUDES AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTY OF QUALITY OR PERFORMANCE. THIS WARRANTY DOES NOT EXTEND TO, AND THE BUYER SHALL BE SOLELY RESPONSIBLE FOR, ANY AND ALL LOSS OR DAMAGE WHICH RESULTS FROM THE USE OF THIS PRODUCT IN ANY MANNER WHICH IS INCONSISTENT WITH THE LABEL DIRECTIONS, WARNINGS OR CAUTIONS.**

**TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BUYER'S EXCLUSIVE REMEDY AND MANUFACTURER'S OR SELLER'S EXCLUSIVE LIABILITY FOR ANY AND ALL CLAIMS, LOSSES, DAMAGES, OR INJURIES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, WHETHER OR NOT BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE, SHALL BE LIMITED, AT THE MANUFACTURER'S OPTION, TO REPLACEMENT OF, OR THE REPAYMENT OF THE PURCHASE PRICE FOR, THE QUANTITY OF PRODUCT WITH RESPECT TO WHICH DAMAGES ARE CLAIMED. IN NO EVENT SHALL MANUFACTURER OR SELLER BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.**

AMVAC offers this product, and Buyer accepts it, subject to the foregoing Limited Warranty which may be varied only by agreement in writing signed by an authorized representative of AMVAC.

Trumpet® is a registered trademark of Amvac Chemical Corporation.

Amvac Chemical Corporation  
4100 E. Washington Blvd.  
Los Angeles, CA 90023 U.S.A.  
1-323-264-3910  
[www.amvac-chemical.com](http://www.amvac-chemical.com)

**AMVAC CHEMICAL CORPORATION**  
**TRUMPET® EC Insecticide**

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## MATERIAL SAFETY DATA SHEET

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** TRUMPET® EC Insecticide

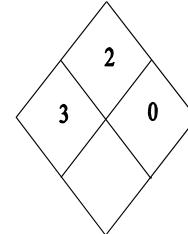
**GENERAL USE:** Insecticide

**PRODUCT DESCRIPTION:** Clear amber liquid with an aromatic solvent odor

**EPA Registration Number:** 5481-481

**MSDS No.:** 283\_7

**Current Revision Date:** 12 December, 2005



**MANUFACTURER:**

AMVAC CHEMICAL CORPORATION  
4100 E. Washington Blvd.  
Los Angeles, CA 90023-4406  
Ph: 323-264-3910  
FAX: 323-268-1028

**EMERGENCY TELEPHONE NUMBERS:**

**MANUFACTURER:** 323-264-3910  
**TRANSPORTATION (24 HOURS)**  
**CHEMTREC:** 800-424-9300  
**OTHER (24 HOURS)**  
**AMVAC:** 323-264-3910

### 2. COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

Component	Naled	DDVP	Naphthalene
<b>Synonyms</b>	1,2-Dibromo-2,2-dichloroethyl dimethylphosphate; DIBROM®	2,2-Dichloroethenyl dimethylphosphate; DICHLORVOS	
<b>CAS Number</b>	300-76-5	62-73-7	91-20-3
<b>Hazard</b>	Poison; Corrosive	Poison, Possible carcinogen	Possible Carcinogen
<b>Wt%, Typical</b>	78.0%	less than 1%	less than 3%
<b>Exposure Limits</b>	OSHA PEL: 3 mg/m <sup>3</sup> ACGIH TLV: 0.1 mg/m <sup>3</sup>	OSHA PEL: 1 mg/m <sup>3</sup> ACGIH TLV 0.1 mg/m <sup>3</sup>	OSHA PEL: 10 ppm ACGIH PEL: 10 ppm ACGIH STEL: 15 ppm

TRUMPET is a registered Trademark of AMVAC Chemical Corporation

**3. HAZARDS IDENTIFICATION**

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**EMERGENCY OVERVIEW:**

**DANGER! POISON! CORROSIVE!** An off-white to straw yellow liquid with a sharp, pungent odor that causes irreversible eye and skin damage. May be fatal if swallowed, inhaled or absorbed through skin and eyes. Is a cholinesterase inhibitor. Rapidly absorbed through skin. Repeated inhalation or skin contact may, without symptoms, progressively increase susceptibility to organophosphate (including Naled) poisoning. May be an aspiration hazard. May cause an allergic reaction.

Product is combustible.

Toxic to fish, birds, and other wildlife.

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**POTENTIAL HEALTH EFFECTS**

**ROUTE(S) OF ENTRY:** May be fatal if swallowed, inhaled, or absorbed through eye or skin. May produce acute cholinesterase depression. May cause corrosive destruction of the skin, mucous membranes and the eyes.

**SIGNS OF ACUTE OVEREXPOSURE:** Acute cholinesterase depression may be evidenced by headache, nausea, vomiting, diarrhea, abdominal cramps, excessive sweating, salivation and tearing, constricted pupils, blurred vision, tightness in chest, weakness, muscle twitching and confusion; in extreme cases, unconsciousness, convulsions, severe respiratory depression and death may occur.

This product is expected to be corrosive to the eyes. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. Expected adverse health effects resulting from direct exposure to the eye may include pain, tears, swelling, redness, blurred vision, irreversible eye damage and possibly blindness.

This product is expected to be corrosive to the skin. The degree of injury will depend on the amount and duration of the contact and the speed and thoroughness of the first aid treatment. The expected adverse health effects resulting from a direct exposure to the skin may include pain or a feeling of heat, discoloration, swelling, blistering, and irreversible tissue damage.

This product is expected to be corrosive to the digestive tract, and, if ingested, may cause nausea, vomiting and diarrhea.

This product is expected to be corrosive to the respiratory tract, and, if inhaled, may cause symptoms that include nasal discharge, sore throat, coughing, bronchitis, pulmonary edema, and difficulty in breathing.

**SIGNS OF CHRONIC OVEREXPOSURE:** Repeated exposures to small doses of Naled and other organophosphates may lower the cholinesterase to levels where the above symptoms of acute overexposure are observed.

### **3. HAZARDS IDENTIFICATION, cont'd**

**CARCINOGENICITY:** There is no evidence of carcinogenicity in laboratory animals tested with Naled Technical. EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP, an impurity in Naled, as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential.". IARC lists DDVP (Dichlorvos) as being possibly carcinogenic to humans (Group 2B). Based on the results of testing in mice, the IARC has recently classified Naphthalene, a component of the solvent used for this formulation, as being possibly carcinogenic to humans (Group 2B). **CARE SHOULD BE EXERCISED IN HANDLING THIS FORMULATION.**

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Preexisting conditions which lower cholinesterase levels increase vulnerability to cholinesterase depression. These include: (for plasma) genetic cholinesterase deficiency; advanced liver disease; chronic alcoholism; malnutrition; dermatomyositis; existing toxicity from exposure to carbon disulfide; benzalkonium salts, organic mercury compounds, ciguatoxins or solanines; and (for RBC) hemolytic anemias.

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### **4. FIRST AID MEASURES**

**TRUMPET® CONTAINS A CHOLINESTERASE INHIBITOR (NALED). A PHYSICIAN SHOULD BE CONTACTED IN ALL CASES OF EXPOSURE TO NALED AND ITS FORMULATIONS. THIS PRODUCT IS CORROSIVE TO EYES AND SKIN.**

**EYES:** Immediately flush the eyes with copious amounts of clear, cool running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. Contact a physician immediately. If there will be a delay in getting medical attention, rinse the eyes for at least another 15 minutes.

**INHALATION:** Remove victim to fresh air. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration. If breathing is difficult, give oxygen. Contact a physician immediately.

**INGESTION:** DO NOT induce vomiting. If victim is conscious, administer an 8 oz. glass of water containing 2 tbsp. activated charcoal. Have person lie on their left side to slow down absorption of the ingested material. Never give anything by mouth to an unconscious person. Contact a physician immediately.

**SKIN:** Immediately flush all affected areas with large amounts of clear water for at least 15 minutes. Remove contaminated clothing. Do not attempt to neutralize with chemical agents. Wash clothing before reuse. Contact a physician immediately.

**NOTE TO PHYSICIANS:** This is an Organophosphate (OP) Insecticide. Do not wait for laboratory confirmation to treat patients with strong clinical evidence of poisoning. In the USA and other countries, contact your local or national poison control center for more information.

**AMVAC CHEMICAL CORPORATION  
TRUMPET® EC Insecticide**

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**4. FIRST AID MEASURES, cont'd**

**Do Not** handle the patient without the following protective equipment in place: chemical resistant gloves and apron (preferably nitrile). Remove contaminated clothing and do not reuse without thorough cleaning with detergent and hot water. Dispose of heavily contaminated clothing, including shoes, as a hazardous waste.

Establish airway and oxygenation. IV Atropine sulfate is the antidote of choice. Moderately severe poisoning: use 0.4-2.0 mg in adults or 0.05 mg/kg in children. Repeat every 15 minutes until atropinization is achieved. Severe poisoning may require larger doses. Cholinergic toxicity may recur as atropinization wears off; monitor patient closely. Draw blood for RBC and plasma cholinesterase. In addition, Pralidoxime (2-PAM) is indicated during the first 36 hours in severe poisonings. Slow IV administration (no less than 2 minutes) of 1 g in adults or 20-50 mg/kg in children may be repeated in 1 to 2 hours if muscle weakness, twitching, and/or respiratory depression persist. Avoid morphine, aminophylline, phenothiazines, reserpine, furosemide and ethacrynic acid.

Bathe and shampoo contaminated skin and hair. If ingested, empty stomach. Due to the presence of aromatic solvents, gastric lavage should be considered following intubation with a cuffed endotracheal tube to prevent aspiration of vomitus. Activated charcoal is useful to further limit absorption.

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**5. FIRE FIGHTING MEASURES**

**FLAMMABLE PROPERTIES**

Flash Point: 174°F (Closed cup)

Autoignition Temperature: No data available

Flammable Limits:

Lower flammable limit: No data available

Upper flammable limit: No data available

Flammability: This is a combustible liquid that will burn when heated (NFPA rating = 2)

**EXPLOSIVITY**

Mechanical Impact: Not explosive

Static Discharge: Will not occur

**HAZARDOUS COMBUSTION PRODUCTS:** This product will emit toxic fumes when burned, including hydrogen chloride, hydrogen bromide, phosphorous oxides and carbon monoxide. Vapors of the unburned product are also hazardous. Contact with the fumes and vapors should be avoided.

**EXTINGUISHING MEDIA:** Foam, dry chemical, carbon dioxide, water spray (fog).

**FIRE FIGHTING INSTRUCTIONS:** Evacuate nonessential personnel from the area. Keep upwind. Wear self-contained breathing apparatus and full bunker gear. Clean all clothing before reuse.

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## **6. ACCIDENTAL RELEASE MEASURES**

**GENERAL:** Evacuate personnel and thoroughly ventilate the area. Use adequate ventilation and appropriate personal protective equipment (PPE, Section 8). Keep bystanders upwind and away from the spill.

**SMALL SPILL:** Cover with nonflammable absorbent (clay, sand, oil dry, kitty litter, etc.) to absorb the liquid. Sweep into an open plastic drum. Decontaminate the area and equipment with dilute alkali or ammonia (less than 5% solution) and detergent. Flush the area with water. Absorb and sweep into the same open plastic drum. Close the drum and dispose of as a hazardous waste.

**LARGE SPILL:** Dike the spill to prevent contamination of local water sources. Siphon the majority of the liquid into drums for use or disposal, depending on the circumstances. Clean the area as described for a small spill.

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## **7. HANDLING AND STORAGE**

**HANDLING:** Prevent skin contact. Do not breathe fumes. Wear appropriate personal protective equipment. (See Section 8) Wash thoroughly and change clothes after handling. Keep product away from food drink, cosmetics, and tobacco products. See product label for more detailed handling procedures.

**STORAGE:** Do not contaminate water, food or feed by storage or disposal. Store product in a cool, dry, locked place out of reach of children. Store in original container.

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## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**ENGINEERING CONTROLS:** A well-ventilated area is recommended for handling TRUMPET®. Use of mechanical or local exhaust systems is recommended.

**RESPIRATORY PROTECTION:** When respiratory protection is required, or concentrations may exceed the PEL, use a NIOSH/MSHA approved air-purifying respirator equipped with new organic vapor cartridges or canisters. A maximum use of eight hours is recommended. For emergency and other conditions where the exposure limit may be greatly exceeded, use an approved positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

**SKIN PROTECTION:** Prevent skin contact. Chemical resistant gloves (preferably nitrile), body covering clothing that has long sleeves and long pants, and chemical resistant shoes or boots, are required to prevent skin contamination. Replace gloves every eight hours or sooner if exposure has been heavy. A chemical resistant apron will provide additional protection when there is a risk of spillage or splashing. Wear clean clothes daily. Wash soiled clothes separately from other laundry. Wash thoroughly after handling this product. See the label for more specific instructions.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION, cont'd**

**EYE PROTECTION:** Safety glasses should be worn whenever working with chemicals. Goggles or a faceshield should be used if there is a chance of mist formation or splashing.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Physical State:</b>	Liquid
<b>Appearance:</b>	A clear amber liquid
<b>Odor:</b>	Aromatic solvent odor
<b>Odor Threshold:</b>	No data available
<b>Boiling Point:</b>	320°F/160°C
<b>Freezing/Melting Point:</b>	60°F/15°C
<b>Specific Gravity(Typical range):</b>	1.67 @ 25°C/4°C (77°F/39°F)
<b>Density:</b>	13.9 lb/gal
<b>Vapor Pressure (mm/Hg):</b>	10 mm Hg @ 100°F
<b>Vapor Density:</b>	Heavier than air
<b>Percent Volatile by Vol:</b>	27.5%
<b>Solubility in Water:</b>	Emulsifies
<b>Solubility (Other):</b>	This product is soluble in aromatic hydrocarbons, chlorinated hydrocarbons, ketones, and esters.
<b>Partition Coefficient (O/W):</b>	approx. 100 (a.i.) at ambient temperatures
<b>pH:</b>	3.6 (1% Dilution in water)
<b>Evaporation Rate:</b>	Not available

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**10. STABILITY AND REACTIVITY**

**CHEMICAL STABILITY (Conditions to avoid):** This product is stable under normal use and storage conditions. It may be photochemically reactive.

**INCOMPATIBILITY:** Unstable in the presence of iron or alkaline media. Corrosive to iron, aluminum and magnesium. Hydrolyzes slowly under neutral or acid conditions.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Heating product to decomposition will cause emission of acrid smoke and fumes of hydrogen chloride, hydrogen bromide, phosphorous oxides, carbon oxides and unknown organic compounds.

**HAZARDOUS POLYMERIZATION:** This product will not polymerize.

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## **11. TOXICOLOGICAL INFORMATION**

Data for ingestion, inhalation, dermal and sensitization are from a similar formulation, DIBROM 8 Emulsive. The irritation data are from testing on this formulation. The rest of the toxicological data are from Naled Technical.

<b>INGESTION:</b>	Oral LD <sub>50</sub> (rat):	235 mg/kg (female) (Toxicity Category II)
<b>INHALATION:</b>	Inhalation LC <sub>50</sub> (rat):	1.51/>2.07 (male/female, 4 hr, nose only) (Toxicity Category III)
<b>DERMAL:</b>	Skin LD <sub>50</sub> (rabbit):	5050/>5050 mg/kg (female/male) (Toxicity Category IV)
<b>IRRITATION:</b>	Eye irritation:	Extremely Irritating (Toxicity Category I)
	Skin irritation:	Corrosive (Toxicity Category I)
<b>SENSITIZATION:</b>	Skin sensitization: (Mouse Local Lymph Node)	Not a sensitizer

**CORROSIVENESS (DOT):** A study with Naled Technical showed that it is considered non-corrosive by DOT criteria when applied to the intact skin of albino rabbits.

**TERATOGENICITY:** Maternal toxicity in rats was observed at 40 mg/kg/day (body weight loss, tremors, painful or difficult breathing, and decreased activity) using Naled Technical (a.i.). No developmental effects were observed at this dose level. The maternal NOEL was 10 mg/kg/day. The developmental NOEL was 40 mg/kg/day.

**REPRODUCTIVE TOXICITY:** In a two-generation rat reproduction study with Naled Technical (a.i.), a decrease in male body weight gain was observed at 18 mg/kg/day; however, no effects on reproduction were found in adult animals. Decreases in offspring survival, number of pups born and decreased pup weights were noted at 18 mg/kg/day. The NOEL for both adults and offspring was 6 mg/kg/day.

**MUTAGENICITY:** No evidence of mutagenicity activity in *in vitro* and *in vivo* tests, using Naled Technical (a.i.).

**CARCINOGENICITY:** No evidence of carcinogenicity in laboratory animals with Naled Technical. However, EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP, an impurity in Naled, as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential". Based on the results of testing in mice, the IARC has recently classified Naphthalene, a component of the solvent used for this formulation, as being possibly carcinogenic to humans (Group 2B).

**TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** No data available.

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## **12. ECOLOGICAL INFORMATION**

**GENERAL:** This product is toxic to fish, birds, and other wildlife. Keep out of any body of water. Do not contaminate water when disposing of equipment washwaters or wastes.

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TRUMPET® EC Insecticide**

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**13. DISPOSAL CONSIDERATIONS**

**WASTE DISPOSAL:** Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed by use according to label instructions, contact your nearest State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance. Open dumping is prohibited.

**CONTAINER DISPOSAL:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke. Contact your nearest State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance. Open dumping is prohibited.

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**14. TRANSPORTATION INFORMATION**

<b>DOT Class:</b>	6.1
<b>CANADA Shipping Class:</b>	6.1
<b>ADR Class (road):</b>	6.1
<b>AUSTRALIAN Shipping Class:</b>	6 Subsection 111
<b>UN Number:</b>	UN3018
<b>IMDG Class (sea):</b>	6.1
<b>IATA Class (air):</b>	6.1
<b>Marine Pollutant:</b>	Yes
<b>Packing Group:</b>	III
<b>Hazard Label(s):</b>	TOXIC
<b>Proper Shipping Name(s):</b>	Organophosphorus pesticides, liquid, toxic (Naled)
<b>Reportable Quantity:</b>	Yes
<b>(DOT, 172.101, Appendix A)</b>	

**PACKAGING**

**General Description:** 30 gal polyethylene drums

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**15. REGULATORY INFORMATION**

**U.S. FEDERAL REGULATIONS:** This product is registered under EPA/FIFRA Regulations. It is a violation of Federal Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

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TRUMPET® EC Insecticide**

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**15. REGULATORY INFORMATION, cont'd**

**SARA TITLE III DATA**

**Section 311 & 312 Hazard Categories:**

Immediate Health Hazard:	Yes
Delayed Health Hazard:	Yes
Fire Hazard:	Yes
Reactive Hazard:	No
Sudden Pressure Release Hazard:	No

**Section 302 Extremely Hazardous Substances:** DDVP (Dichlorvos, 62-73-7)

**Section 313 Toxic Chemicals:** Naled (300-76-5); DDVP (Dichlorvos, 62-73-7);  
Naphthalene (91-20-3)

**CERCLA /EHS Reportable Quantity (RQ):** DDVP (Dichlorvos) - 10 lbs; Naled - 10 lbs;  
Naphthalene - 100 lb; Product (calc'd) - 15 lbs

**STATE REGULATIONS:**

**CALIFORNIA (Proposition 65):** This product contains chemicals known to the State of California  
to cause cancer - DDVP and Naphthalene.

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**16. OTHER INFORMATION**

**MSDS Status:**

**Date This Revision:** 12 December, 2005

**Date Previous Revision:** 19 December 2003

**Person Responsible for Preparation:** Gary A. Braden

**Reasons for Revision:** Changes have been made in sections 5, 6, 8, and 11 to correct typographical  
errors or to clarify instructions given in these sections.

**DISCLAIMER:** This information is provided for the limited guidance to the user. While AMVAC  
believes that the information is, as of the date hereof, reliable, it is the user's responsibility  
to determine the suitability of the information for its purposes. The user is advised not to  
construe the information as absolutely complete since additional information may be  
necessary or desirable when particular, exceptional, or variable conditions or circumstances  
exist (like combinations with other materials), or because of applicable regulations. No  
express or implied warranty of merchantability or fitness for a particular purpose or otherwise  
is made hereunder with respect to the information or the product to which the information  
relates.

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**16. OTHER INFORMATION, cont'd**

**ABBREVIATIONS:**

a.i.	-	active ingredient
ACGIH	-	American Conference of Governmental Industrial Hygienists
ADR	-	Mark used to indicate European Approval for the Transport of Dangerous Goods by Road
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	-	Department of Transportation (USA)
EPA	-	Environmental Protection Agency
FIFRA	-	Federal Insecticide, Fungicide, and Rodenticide Act
IARC	-	International Agency for Research on Cancer
IATA	-	International Air Transport Association
IMDG	-	International Maritime Dangerous Goods
NTP	-	National Toxicology Program
OSHA	-	Occupational Safety and Health Agency
SARA	-	Superfund Amendments and Reauthorization Act
TSCA	-	Toxic Substances Control Act

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This is the last page of this MSDS. There should be 10 pages.

# Mavrik®

## Perimeter

- FOR COMMERCIAL USE ONLY ON OUTDOOR PLANTS IN ORNAMENTAL PLANTINGS, PLANTSCAPES (INCLUDING TREES AND SHRUBS) AND FOR PERIMETER TREATMENT AROUND BUILDINGS AND OUTSIDE SURFACES
- PERIMETER TREATMENT AGAINST A WIDE RANGE OF INSECTS INCLUDING MOSQUITOES AND FIRE ANTS
- IDEAL FOR APPLICATIONS WITHOUT THE WORRY OF WATERING-IN
- CONTAINS TAU-FLUVALINATE
- SMALL, EASY TO USE 8 OZ. BOTTLE

## SPECIMEN LABEL

### ACTIVE INGREDIENT:

Tau-fluvalinate (CAS #102851-06-9) . . . 22.3%

OTHER INGREDIENTS: . . . . . 77.7%

Total . . . . . 100.0%

MAVRIK® PERIMETER is a flowable formulation containing 2 pounds tau-fluvalinate per gallon (240 g/L).

EPA Reg. No. 2724-478    EPA Est. No. 2724-TX-1

KEEP OUT OF REACH OF CHILDREN

### CAUTION

READ COMPLETE DIRECTIONS AND  
PRECAUTIONS INSIDE

### SHAKE WELL BEFORE USING

Not use use on plants or trees being grown for sale or other commercial use, for commercial seed production, for the production of timber or wood products, or for research purposes. For use only on plants intended for aesthetic purposes or climatic modification and being grown in ornamental gardens or parks and grounds.

### PRECAUTIONARY STATEMENTS

#### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

### CAUTION

Harmful if swallowed, absorbed through the skin, or inhaled. Causes moderate eye irritation. Avoid contact with eyes, skin, or clothing. Avoid breathing spray mist or vapor. Wear long-sleeved shirt, long pants, shoes, socks, and chemical resistant gloves (such as or made out of any waterproof material, selection category A).

### FIRST AID

If swallowed • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.

If on skin or clothing • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.

If inhaled • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.

If in eyes • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eyes. • Call a poison control center for treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-800-248-7763 for emergency medical treatment information.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are made of any waterproof material. If you want more options, follow the instructions for category A on an EPA chemical resistance category selection chart.

All mixers, loaders, applicators and other handlers must wear:  
• Long-sleeved shirt and long pants  
• Shoes and socks  
• Chemical-resistant gloves, and  
• A NIOSH approved respirator with dust/mist filter with MSHA/NIOSH approval number prefix TC-21C or R, P, or HE filter.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing or other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

#### USER SAFETY RECOMMENDATIONS

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

#### ENVIRONMENTAL HAZARDS

This product is toxic to fish and aquatic organisms. This product is toxic to honey bees if bees are exposed to direct application. However, dried residues of this product are non-toxic to honey bees. Treat during non-foraging periods to minimize adverse effects. Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Use with care when applying in areas adjacent to any body of water. Drift and runoff from treated areas may be hazardous to fish and aquatic organisms in adjacent aquatic sites. Do not apply when weather conditions favor drift from the target area. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

#### PHYSICAL/CHEMICAL HAZARDS

Do not use or store near heat or open flame.

#### STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal. **Pesticide Storage:** Store in a cool, dry place. Pesticides must be stored in a secured area away from other products, food, or feed. Keep pesticide storage areas clean. Always store pesticides in the original container. If a leaky container must be contained within another, mark the outer container to identify the contents. In case of a spill or leak, soak up with soil or other absorbent material. Do not use caustic agents.

**Pesticide Disposal:** To avoid wastes, use all material in this container by application according to label directions. If wastes cannot be avoided, offer remaining product to a waste disposal facility or disposal program (often such programs are run by state or local governments or by industry).

**Container Handling:** Non-refillable container. Do not reuse or refill this container. Triple rinse as follows. Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

#### STORAGE AND DISPOSAL (CONTINUED)

Then offer for recycling, if available or puncture or dispose of in a sanitary landfill, or if allowed by state and local authorities by burning. If burned, stay out of smoke.

#### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

#### GENERAL PRECAUTIONS/RESTRICTIONS

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

Keep unprotected people, children and pets out of treated area until spray has dried. Some sensitive pets eating or coming in contact with freshly treated plants may demonstrate vomiting and respiratory distress.

Do not apply this product by aerial application or through any type of irrigation system.

#### GENERAL DIRECTIONS

MAVRIK® PERIMETER controls insects and controls or suppresses mite pests when used at labeled rates. MAVRIK® PERIMETER works primarily through contact action, good spray coverage is necessary. Treat when pests are immature or at a susceptible stage and populations are manageable, before damage occurs. Repeat applications as needed, according to the specific use directions given in this label. Residues of MAVRIK® PERIMETER can continue to control certain insect pests for a week or longer. Growth dilution, climatic variables, and pest habits determine retreatment needs.

Dilute MAVRIK® PERIMETER in sufficient water to give thorough spray coverage [based on previous experience]. For best results under varying conditions, a range of use rates is recommended for most uses. Select the higher rates when pest pressure or damage potential is severe. The lower rates often give acceptable economic results. Buffer spray water to pH 5-7, if necessary.

For severe mite infestations, use the highest rate of MAVRIK® PERIMETER and use an acaricide in an alternate treatment program. The use of a spreader-sticker, insecticidal soaps, or piperonyl butoxide may improve control of mites and some insects, such as, whiteflies, aphids, thrips, and mealybugs. When MAVRIK® PERIMETER is mixed with wettable powders, add powders to the tank first using good agitation. Check for physical and biological compatibility prior to use.

Dried residues of MAVRIK® PERIMETER are non-toxic and non-repellent to honey bees. Treat during non-foraging periods to minimize adverse effects.

Consult your local extension office, pest management consultant, or a Wellmark International specialist for guidance in selecting a rate and timing schedule or mixing combination that has demonstrated good performance under specific conditions.

## AMOUNT MAVRIK® PERIMETER

## IN WATER TO MAKE

## 5 GALLONS

## 1 GALLON

## SPECIFIC DIRECTIONS

SITE	PEST			
<b>For Outdoor Applications:</b> Use lower rates and greater re-treatment intervals for light to moderate insect pressures. Use higher rates and shorter re-treatment intervals for green peach aphids, unexposed insects and heavy pressures of other insects. Mite suppression can be obtained using the lower rate; for more residual control of mites, use up to 0.5 fl oz/5 gallons water [0.1 fl oz/1 gallon of water].				
Perimeter Treatments to include Outside Surfaces	Aphids, Thrips, Mites, Clover Mites, Two-Spotted Spider Mites, Whiteflies, Mealybugs, Leaf-Feeding Caterpillars (i.e., Tent, Orlando, Gypsy Moth, Bagworm, Canker Worm, etc.), Ticks, Brown Dog Ticks, American Dog Ticks, Deer Ticks, Fleas, Ants, Fire Ants, Crickets, Armyworms, Cutworms, Springtails (Collembola), Adelgids, Mosquitoes, Chiggers*, Earwigs, Lygus Plant Bugs, Beetles (Flea, Cucumber, Elm Leaf), Leafhoppers, Weevils* (Strawberry Root, Obscure Root, Blackvine Root), Psyllids, Millipedes*, American Cockroaches, Smoky Brown Cockroaches, Oriental Cockroaches, Boxelder Bugs, Spiders, Silverfish, Firebrats, Chinch Bugs, Asian Lady Beetles*, Sowbugs, Glassy-Wing Sharpshooters  * Except in California	0.2–0.5 fl oz (1½–3 teaspoons) (6–15 ml)	.04–0.1 fl oz (1/3–2/3 teaspoon) (1.2–3 ml)	<p>Apply MAVRIK® PERIMETER to perimeters and outside surfaces of residential, non-commercial, and commercial buildings such as industrial offices, institutional buildings, private homes, duplexes, townhouses, condominiums, house trailers, apartment complexes, carports, garages, storage sheds, patios.</p> <p>Apply MAVRIK® PERIMETER using a low pressure, coarse fan spray, applied in even bands to surfaces and perimeters where pests are a problem. Apply the spray mixture at a volume equivalent to 5 gallons per 1,000 square feet. Depending on the severity of pest infestations, a re-treatment may be necessary at 7–14 days. Apply no more than 4 times per month or no more than 20 times per year. Typical re-treatment interval is 28 days.</p> <p>When using cold foggers or other ULV delivery systems for perimeter applications, apply the labeled amount of MAVRIK® PERIMETER over the square footage with the equipment manufacturer's requirement of water. Follow manufacturer's calibration procedures.</p> <p>Perimeter applications are made to a band of soil and/or vegetation 6 to 10 feet wide around and adjacent to the structure. Higher volumes of water may be needed if mulch or leaf litter is present or foliage is dense. These sites may include refuse dumps, vegetation areas, soil, trunks of woody ornamentals, and fence lines adjacent to or around the structure, and other areas near a structure where pests congregate or have been seen.</p> <p>Surface applications can be made to all outside surfaces of structures listed above and includes porches, window and door frames, eaves, and foundations. Apply as a crack and crevice treatment using a pinstream nozzle to pest harborage sites. Refrain from applying to the point of runoff.</p>

**AMOUNT MAVRIK® PERIMETER  
IN WATER TO MAKE**

<b>SITE</b>	<b>PEST</b>	<b>5 GALLONS</b>	<b>1 GALLON</b>	<b>SPECIFIC DIRECTIONS</b>
Woody and Herbaceous Ornamentals—Outdoors	Aphids, Thrips, Mites, Clover Mites, Whiteflies, Leaf-Feeding Caterpillars (i.e., Tent, Orlando, Gypsy Moth, Bagworm, Canker Worm, etc.), Lygus Plant Bugs, Beetles (Flea, Cucumber, Elm Leaf), Leafhoppers, Earwigs, Ants, Crickets, Armyworms, Cutworms, Sowbugs, Chiggers*, Millipedes*, Springtails (Collembola), Adelgids, Mosquitoes, Glassy -Wing Sharpshooters, Strawberry Root Weevils*, Obscure Root Weevils*, Blackvine Root Weevils*	0.2–0.5 fl oz (1 1/3–3 teaspoons)	.04–0.1 fl oz (1.2–3 ml) (1/3–2/3 teaspoon)	Make applications to large, mature ornamental specimen plants or plants in containers larger than 5 gallons in size. Mix 0.2–0.5 fl oz or 1 1/3–3 teaspoons of MAVRIK® PERIMETER in 5 gallons of water. Apply 5 gallons of spray solution per equivalent of 1,000 square feet of growing area using a low pressure, coarse fan spray application. Spray interval is typically 14–28 days but not more than 4 applications per month. Do not exceed 24 applications per year. Use sufficient water to thoroughly cover the surfaces to be treated. Use lower rates for light to moderate insect pressure. Spray on ground around base of tree or shrub and/or up main trunk or stem and foliage.
Eugenia and Pepper Tree	Psyllids	0.25–0.5 fl oz (1 1/2–3 teaspoons)	0.5–0.1 fl oz (1/3–2/3 teaspoon)	Apply 0.25–0.5 fl oz (1 1/2–3 teaspoons) of MAVRIK® PERIMETER per 5 gallons of water to protect new foliage, depending on pest pressure. Use the higher rate of MAVRIK® PERIMETER for heavier infestations of psyllids. Apply 2 applications at 14 day intervals under heavy reinestation pressure or if new foliage is present. If pruning is needed, prune the entire hedge, then delay application until adults and new shoots are present.
Ant Mound Treatment	Fire Ants and other mounding ant pests	0.5 fl oz (15 ml) (3 teaspoons)	0.1 fl oz (3 ml) (2/3 teaspoon)	<b>Individual ant mound treatment:</b> Apply as drench using 1 gallon of spray solution per mound to control mounding ant colonies, including the fire ant. Thoroughly mix 2/3 teaspoon (0.1 fl oz/3 ml) of MAVRIK® PERIMETER with 1 gallon of water. Drench the mound using 1 gallon of dilution per mound. Apply the dilution starting on the perimeter of the mound and ending at the center of the mound until the entire mound is wet but not to the point of runoff.

To the extent consistent with applicable law, Seller makes no warranty, express or implied, concerning the use of this product other than indicated on the label. To the extent consistent with applicable law, Buyer assumes all risk of use and handling of this material when such use and handling are contrary to label instructions.

For more information or in case of emergency, call **1-800-248-7763**. [www.zoecon.com](http://www.zoecon.com)

**Wellmark International**

1501 East Woodfield Road 200W  
Schaumburg, Illinois 60173



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# ANVIL® 2+2 ULV

Contains An Oil Soluble Synergized Synthetic Pyrethroid For Control of Adult Mosquitoes (Including Organophosphate-Resistant Species) Midges, and Black Flies in Outdoor Residential and Recreational Areas.

## Precautionary Statements HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Harmful if absorbed through the skin. Avoid contact with skin, eyes or clothing. In case of contact, flush with plenty of water. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

## ENVIRONMENTAL HAZARDS

This product is toxic to fish. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish. Do not apply over permanent bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fish ponds, swamps, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material beyond the body of water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment rinsate or wash waters.

This product is toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply to blooming crops or weeds when bees are actively visiting the treatment area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

## PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame.

## DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

For use only by federal, state, tribal or local government officials responsible for public health or vector control, or by persons certified in the appropriate category or otherwise authorized by the state or tribal lead pesticide regulatory agency to perform adult mosquito control applications, or by persons under their direct supervision.

E.P.A. EST. No. 1021-MN-2  
EPA Reg. No.1021-1687-8329

## NET CONTENTS

## LOT NO.

### ACTIVE INGREDIENTS:

3-Phenoxybenzyl-(1RS, 3RS; 1RS, 3SR)-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate .....	2.00%
* Piperonyl Butoxide, Technical .....	2.00%
** OTHER INGREDIENTS.....	96.00%
	100.00%

\* Equivalent to 1.60% (butylcarbityl) (6-propylpiperonyl) ether and .40% related compounds

\*\* Contains a petroleum distillate

Contains 0.15 pounds of Technical SUMITHRIN®/Gallon and 0.15 pounds Technical Piperonyl Butoxide/Gallon

SUMITHRIN®- Registered trademark of Sumitomo Chemical Company, Ltd.

**KEEP OUT OF REACH  
OF CHILDREN  
CAUTION**

PRECAUCION AL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta haya sido explicado ampliamente.

## FIRST AID

IF SWALLOWED • Immediately call a poison control center or doctor. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give any liquid to the person. • Do not give anything by mouth to an unconscious person

IF ON SKIN OR CLOTHING: • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.

NOTE TO PHYSICIAN: Contains a petroleum distillate – vomiting may cause aspiration pneumonia.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For information regarding medical emergencies or pesticide incidents, call the International Poison Center at 1-888-740-8712.

MANUFACTURED FOR

## CLARKE MOSQUITO CONTROL PRODUCTS, INC.

159 N. GARDEN AVENUE • ROSELLE, ILLINOIS 60172

NOTICE: Seller makes no warranty, expressed or implied concerning the use of this product other than indicated on the label. Buyer assumes all risk of use and/or handling of this material when use and/or handling is contrary to label instructions.

Before making the first application in a season, it is advisable to consult with the state or tribal agency with primary responsibility for pesticide regulation to determine if other requirements exist.

**IN CALIFORNIA:** This product is to be applied by County Health Department, State Department of Health Services, Mosquito and Vector Control or Mosquito Abatement District personnel only.

**USE AREAS:** For use in mosquito adulticiding programs involving outdoor residential and recreational areas where adult mosquitoes are present in annoying numbers in vegetation surrounding parks, woodlands, swamps, marshes, overgrown areas and golf courses.

For best results, apply when mosquitoes are most active and weather conditions are conducive to keeping the fog close to the ground. i.e. cool temperatures and wind speed not greater than 10 mph.

Do not treat a site with more than 0.0036 pounds of Sumithrin® per acre in a 24-hour period. Do not exceed 1.0 pounds of Sumithrin® per acre in any site in any year. More frequent applications may be made to prevent or control a threat to public and/or animal health determined by a state, tribal, or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

Note: ANVIL 2+2 ULV can not be diluted in water. Dilute this product with light mineral oil if dilution is preferred.

## SPRAY DROPLET SIZE DETERMINATION

**Ground Equipment:** Spray equipment must be adjusted so that the volume median diameter (VMD) is 8 to 30 microns ( $8 \leq D_v \leq 30 \text{ um}$ ) and that 90% of the spray is contained in droplets smaller than 50 microns ( $D_v 0.9 < 50 \text{ um}$ ). Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

**Aerial Equipment:** Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns ( $D_v < 60 \text{ um}$ ) and that 90% of the spray is contained in droplets smaller than 100 microns ( $D_v 0.9 < 100 \text{ um}$ ). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

## GROUND ULV APPLICATION

Apply ANVIL 2+2 ULV through a standard ULV cold aerosol or non-thermal aerosol (cold fog) generator. Consult the following table for examples of various dosage rates using a swath width of 300 feet for acreage calculations.

Dosage Rate Lbs Sumithrin®/acre	Fl. oz. ANVIL 2+2 ULV per Acre	Flow Rates in fluid oz./minute at truck speeds of:			
		5MPH	10MPH	15MPH	20MPH
0.0036	3.0	9.3 oz.	18.6 oz	27.9 oz	37.2 oz
0.0024	2.0	6.2 oz	12.4 oz	18.6 oz	24.8 oz
0.0012	1.0	3.1 oz	6.2 oz	9.3 oz	12.4 oz

**ANVIL 2 + 2 ULV** may be applied undiluted with a non-thermal ULV portable "backpack" spray unit capable of delivering particles in the 5 to 25 micron range. Apply at a walking speed 2 mph, making sure that the same amount of A.I. is applied per acre.

**ANVIL 2 + 2 ULV** may be applied with suitable thermal fogging equipment. Do not exceed the maximum rates listed above. May be applied at speeds of 5 to 20 mph.

## AERIAL APPLICATION

Prohibition on aerial use: Not for aerial application in Florida unless specifically authorized by the Bureau of Entomology, Florida Department of Agriculture and Consumer Service.

ANVIL 2+2 ULV may be applied at rates of 1.0 to 3.0 fluid ounces of ANVIL 2+2 ULV per acre by fixed wing or rotary aircraft equipped with suitable ULV application equipment. Aerial application should be made at an altitude below 300 feet. Do not apply when ground wind speeds exceed 10 mph.

Dosage Rate Lbs Sumithrin®/acre	Flow Rates in fluid oz./acre ANVIL® 2 + 2 ULV	Flow Rates in fluid oz./acre			
		0.0036	3.0 oz	0.0024	2.0 oz
0.0036	3.0 oz	3.0 oz	3.0 oz	3.0 oz	3.0 oz
0.0024	2.0 oz	2.0 oz	2.0 oz	2.0 oz	2.0 oz
0.0012	1.0 oz	1.0 oz	1.0 oz	1.0 oz	1.0 oz

## STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

**STORAGE:** Store in a cool, dry place. Keep container closed.

**CONTAINER DISPOSAL:** Triple rinse (or equivalent) then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other approved state and local procedures.

**PESTICIDE DISPOSAL:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**FOR MORE INFORMATION CALL:**

**1-800-323-5727**

AL0002



# ANVIL® 10+10 ULV

Contains An Oil Soluble Synergized Synthetic Pyrethroid For Control of Adult Mosquitoes  
(Including Organophosphate-Resistant Species) In Outdoor Residential  
and Recreational Areas.

## Precautionary Statements

### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Harmful if absorbed through the skin. Avoid contact with skin, eyes or clothing. In case of contact, flush with plenty of water. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

### ENVIRONMENTAL HAZARDS

This product is toxic to fish. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish. Do not apply over permanent bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fish ponds, swamps, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material beyond the body of water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment rinsate or wash waters.

This product is toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply to blooming crops or weeds when bees are actively visiting the treatment area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

### SAMPLE

### PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame.

### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

For use only by federal, state, tribal or local government officials responsible for public health or vector control, or by persons certified in the appropriate category or otherwise authorized by the state or tribal lead pesticide regulatory agency to perform adult mosquito control applications, or by persons under their direct supervision.

E.P.A. EST. No. 1021-MN-2  
EPA Reg. No. 1021-1688-8329  
**NET CONTENTS**

**LOT NO.**

#### ACTIVE INGREDIENTS:

3-Phenoxybenzyl-(1RS, 3RS; 1RS, 3SR)-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate ..	10.00%
* Piperonyl Butoxide, Technical.....	10.00%
** OTHER INGREDIENTS .....	80.00%

\* Equivalent to 8.00% (butylcarbityl) (6-propylpiperonyl) ether and 2.00% related compounds

\*\* Contains a petroleum distillate

Contains 0.74 pounds of Technical SUMITHRIN®/Gallon and 0.74 pounds

Technical Piperonyl Butoxide/Gallon

SUMITHRIN®- Registered trademark of Sumitomo Chemical Company, Ltd.

**KEEP OUT OF REACH  
OF CHILDREN  
CAUTION  
ABEL**

PRECAUCIONAL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta haya sido explicado ampliamente.

#### FIRST AID

IF SWALLOWED • Immediately call a poison control center or doctor. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give any liquid to the person. • Do not give anything by mouth to an unconscious person

IF ON SKIN OR CLOTHING: • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.

NOTE TO PHYSICIAN: Contains a petroleum distillate – vomiting may cause aspiration pneumonia.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For information regarding medical emergencies or pesticide incidents, call the International Poison Center at 1-888-740-8712.

MANUFACTURED FOR  
**CLARKE MOSQUITO CONTROL  
PRODUCTS, INC.**

159 N. GARDEN AVENUE • ROSÉLLE, ILLINOIS 60172

NOTICE: Seller makes no warranty, expressed or implied concerning the use of this product other than indicated on the label. Buyer assumes all risk of use and/or handling of this material when use and/or handling is contrary to label instructions.

Before making the first application in a season, it is advisable to consult with the state or tribal agency with primary responsibility for pesticide regulation to determine if other requirements exist.

**IN CALIFORNIA:** This product is to be applied by County Health Department, State Department of Health Services, Mosquito and Vector Control or Mosquito Abatement District personnel only.

**USE AREAS:** For use in mosquito adulticiding programs involving outdoor residential and recreational areas where adult mosquitoes are present in annoying numbers in vegetation surrounding parks, woodlands, swamps, marshes, overgrown areas and golf courses.

For best results, apply when mosquitoes are most active and weather conditions are conducive to keeping the fog close to the ground. i.e. cool temperatures and wind speed not greater than 10 mph.

Do not treat a site with more than 0.0036 pounds of Sumithrin® per acre in a 24-hour period. Do not exceed 1.0 pounds of Sumithrin® per acre in any site in any year. More frequent applications may be made to prevent or control a threat to public and/or animal health determined by a state, tribal, or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

Note: ANVIL 10+10 ULV can not be diluted in water. Dilute this product with light mineral oil if dilution is preferred.

## SPRAY DROPLET SIZE DETERMINATION

**Ground Equipment:** Spray equipment must be adjusted so that the volume median diameter (VMD) is 8 to 30 microns ( $8 \leq D_v \leq 30 \text{ um}$ ) and that 90% of the spray is contained in droplets smaller than 50 microns ( $D_v 0.9 < 50 \text{ um}$ ). Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

**Aerial Equipment:** Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns ( $D_v < 60 \text{ um}$ ) and that 90% of the spray is contained in droplets smaller than 100 microns ( $D_v 0.9 < 100 \text{ um}$ ). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

## GROUND ULV APPLICATION

Apply ANVIL 10+10 ULV through a standard ULV cold aerosol or non-thermal aerosol (cold fog) generator. Consult the following table for examples of various dosage rates using a swath width of 300 feet for acreage calculations.

Dosage Rate Lbs Sumithrin®/acre	Fl. oz. ANVIL 10+10 ULV per Acre	Flow Rates in fluid oz./minute at truck speeds of:			
		5MPH	10MPH	15MPH	20MPH
0.0036	0.62	1.9 oz.	3.8 oz	5.7 oz	7.6 oz
0.0024	0.42	1.3 oz	2.5 oz	3.8 oz	5.1 oz
0.0012	0.21	0.6 oz	1.3 oz	1.9 oz	2.5 oz

**ANVIL 10 + 10 ULV** may be applied undiluted with a non-thermal ULV portable "backpack" spray unit capable of delivering particles in the 5 to 25 micron range. Apply at a walking speed of 2 mph, making sure that the same amount of A.I. is applied per acre.

**ANVIL 10 + 10 ULV** may be applied with suitable thermal fogging equipment. Do not exceed the maximum rates listed above. May be applied at speeds of 5 to 20 mph.

## AERIAL APPLICATION

Prohibition on aerial use: Not for aerial application in Florida unless specifically authorized by the Bureau of Entomology, Florida Department of Agriculture and Consumer Service.

ANVIL 10+10 ULV may be applied at rates of 0.21 to 0.62 fluid ounces of ANVIL 10+10 ULV per acre by fixed wing or rotary aircraft equipped with suitable ULV application equipment. ANVIL 10+10 ULV may also be diluted with a suitable solvent such as mineral oil and applied by aerial ULV equipment so long as 0.62 fluid ounces per acre of ANVIL 10+10 ULV is not exceeded. Aerial application should be made at an altitude below 300 feet. Do not apply when ground wind speeds exceed 10 mph.

Dosage Rate Lbs Sumithrin®/acre	Flow Rates in fluid oz./acre ANVIL® 10 + 10 ULV			
		.0036	.0024	.0012
0.0036	.62 oz			
0.0024	.42 oz			
0.0012	.21 oz			

## STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

**STORAGE:** Store in a cool, dry place. Keep container closed.

**CONTAINER DISPOSAL:** Triple rinse (or equivalent) then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other approved state and local procedures.

**PESTICIDE DISPOSAL:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**FOR MORE INFORMATION CALL:**

**1-800-323-5727**

AL0001

# DUET®

## Dual-action Adulicide

A quick knockdown oil soluble synergized synthetic pyrethroid for effective control of adult MOSQUITOES, GNATS, BITING and NON-BITING MIDGEs, and BLACK FLIES in outdoor residential and recreational areas.



[www.clarke.com](http://www.clarke.com)

### Active Ingredients

Prallethrin: (RS)-2-methyl-4-oxo-3-(2-propynyl) cyclopent-2-enyl-(1RS)-cis,trans-chrysanthemate	1.00%
Sumithrin®: 3-Phenoxybenzyl-(1RS, 3RS; 1RS, 3SR)-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate	5.00%
Piperonyl Butoxide, Technical *	5.00%
Other Ingredients **	89.00%
	100.00%

Contains 0.075 pounds of Prallethrin/Gallon, 0.375 pounds of Sumithrin®/Gallon, and 0.375 pounds Technical Piperonyl Butoxide/Gallon

\* Equivalent to 4.00% (butylcarbitol) (6-propylpiperonyl) ether and 1.00% related compounds.

\*\* Contains petroleum distillate

## CAUTION

### KEEP OUT OF REACH OF CHILDREN

PRECAUCION AL USUARIO: Si usted no lee inglés, no use este producto hasta que la etiqueta haya sido explicado ampliamente

### FIRST AID

**IF SWALLOWED:** Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or a doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

**Have the product container or label with you** when calling a poison control center or doctor, or going for treatment. For information regarding medical emergencies or pesticide incidents, call 1-888-740-8712.

**NOTE TO PHYSICIAN:** Contains petroleum distillate – vomiting may cause aspiration pneumonia.

### PRECAUTIONARY STATEMENTS

#### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

**CAUTION:** Harmful if swallowed. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

#### ENVIRONMENTAL HAZARDS

This product is toxic to aquatic organisms, including fish and aquatic invertebrates. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates. Do not apply over bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fish ponds, swamps, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material beyond the body of water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment rinsate or wash waters.

**BEE WARNING:** This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply to or allow drift onto blooming crops or weeds when bees are visiting the treatment area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

#### PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame.

### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

For use only by federal, state, tribal or local government officials responsible for public health or vector control, or by persons certified in the appropriate category or otherwise authorized by the state or tribal lead pesticide regulatory agency to perform adult mosquito control applications, or by persons under their direct supervision.

Before making the first application in a season, it is advisable to consult with the state

or tribal agency with primary responsibility for pesticide regulation to determine if other regulatory requirements exist.

**IN CALIFORNIA:** This product is to be applied by County Health Department, State Department of Health Services, Mosquito and Vector Control or Mosquito Abatement District personnel only.

**PROHIBITION ON AERIAL USE:** Not for aerial application in Florida unless specifically authorized by the Bureau of Entomology, Florida Department of Agriculture and Consumer Services.

Do not contaminate food, feed or drinking water. Do not spray this product on or allow it to drift onto pastureland, rangeland, cropland, poultry ranges, or potable water supplies. In treatment of corrals, feed lots, swine lots and zoos, cover any exposed drinking water, drinking water fountains and animal feed before application.

Wear long sleeved shirt and long pants, socks and shoes.

**DUET™ Dual-action Adulicide** cannot be diluted in water. Dilute this product with light mineral oil if dilution is preferred.

**USE AREAS:** For use in mosquito adulticiding programs involving outdoor residential and recreational areas where adult mosquitoes are present in annoying numbers, and in vegetation surrounding parks, woodlands, swamps, marshes, overgrown areas and golf courses. For best results, apply when mosquitoes are most active and meteorological conditions are conducive to keeping the spray cloud close to the ground. Application in calm air conditions is to be avoided. Apply only when ground wind speed is greater than 1 mph. Air temperature should be greater than 50 F when conducting all types of applications. Do not treat a site with more than 0.0036 pounds of sumithrin or 0.00072 pounds of prallethrin per acre in a 7-day period. More frequent applications may be made if adult mosquitoes have reinfested the treatment area and to prevent or control a threat to public and/or animal health determined by a state, tribal, or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort. Do not exceed 0.094 pounds of sumithrin or 0.019 pounds of prallethrin in any site in a year.

When targeting *Aedes taeniorhynchus* and other difficult species, applications may be made at rates up to 0.007 lbs a.i./acre for Sumithrin and Piperonyl Butoxide.

### SPRAY DROPLET SIZE DETERMINATION

**Ground-based Application:** Spray equipment must be adjusted so that the volume median diameter (VMD) is between 8 and 30 microns ( $D_v 0.5 < 30 \mu m$ ) and that 90% of the spray is contained in droplets smaller than 50 microns ( $D_v 0.9 < 50 \mu m$ ). Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

**Aerial Application:** Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns ( $D_v 0.5 < 60 \mu m$ ) and that 90% of the spray is contained in droplets smaller than 115 microns ( $D_v 0.9 < 115 \mu m$ ). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant, or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

### GROUND ULV APPLICATION

To control Mosquitoes and other listed insects, apply DUET™ Dual-action Adulicide at a flow rate of 2.5 to 7.4 fluid ounces per minute at an average vehicle speed of 10 mph using a swath width of 300 feet for acreage calculations (see chart below). Under normal residential conditions a flow rate of 4.6 fluid ounces per minute is recommended. If a different vehicle speed is used, adjust rate accordingly. These rates are equivalent to 0.00024 to 0.00072 pounds of Prallethrin and 0.0012 to 0.0036 pounds of Sumithrin® and piperonyl butoxide per acre. Vary flow rate according to vegetation density and mosquito population. Use higher flow rate in heavy vegetation or when populations are high. For proper application, mount the applicator so the nozzle is at least 4 ½ feet above ground level and directed out the back of the vehicle. Failure to follow the above directions may result in reduced effectiveness. DUET™ Dual-action Adulicide may also be diluted with a suitable solvent such as mineral oil and applied by GROUND U.L.V. equipment so long as 1.23 fluid ounces per acre of DUET™ Dual-action Adulicide is not exceeded. Refer to the tables below for flow rate calculations for diluted end-use formulations of DUET™ Dual-action Adulicide.

Use the following table to calculate application rates:

Prallethrin	Pounds a.i./Acre Sumithrin®	PBO	DUET™ Fl.oz./Acre	Flow Rates in fluid oz./minute at truck speeds of:			
				5 MPH	10 MPH	15 MPH	20 MPH
0.00072	0.0036	0.0036	1.23	3.7	7.4	11.2	14.9
0.00044	0.0022	0.0022	0.75	2.3	4.6	6.8	9.1
0.00036	0.0018	0.0018	0.61	1.9	3.7	5.6	7.4
0.00024	0.0012	0.0012	0.41	1.2	2.5	3.7	5.0

DUET Dual-action Adulicide may also be applied undiluted with non-thermal, portable, motorized backpack equipment adjusted to deliver ULV particles of 50 to 100 microns VMD. Use 0.41 to 1.23 fl.oz. of the undiluted spray per acre (equal to 0.0012 to 0.0036 lb. sumithrin/acre) as a 50 ft (15.2 m) swath while walking at a speed of 2 mph (3.2 kph).

DUET Dual-action Adulticide may be applied for urban ULV mosquito control. For control of resting or flying adult mosquitoes, biting flies and biting midges in areas such as utility tunnels, sewers, storm drains and catch basins, pipe chases, underground basements, underground passages, parking decks, crawl spaces or uninhabited buildings. DUET Dual-action Adulticide may be applied using mechanical foggers, hand-held or truck mounted ULV equipment, non-thermal foggers or other spray equipment suitable for this application. Apply DUET Dual-action Adulticide at rates up to but not exceeding 0.0036 pounds sumithrin per acre in a 7-day period (not to exceed 0.094 pounds sumithrin per acre in any site in any year).

### AERIAL APPLICATION

Application shall be made when ground wind speed is equal to or greater than 1 mph. Applications shall be made when surface temperature exceeds 50°F. Application shall be made at 75 feet to 300 feet for rotary aircraft and 100 to 300 feet for fixed-wing aircraft. Flow rate and swath width shall be set so as to achieve 0.41 to 1.23 fluid ounces of DUET™ Dual-action Adulticide per acre. Appropriate spray systems include rotary atomizers, flat fan, high pressure, and high pressure impaction nozzles characterized and oriented to achieve the droplet characteristics above.

DUET™ Dual-action Adulticide may also be diluted with a suitable solvent such as mineral oil and applied by aerial U.L.V. equipment so long as 1.23 fluid ounces per acre of DUET™ Dual-action Adulticide is not exceeded. Refer to the tables below for flow rate calculations for diluted end-use formulations of DUET™ Dual-action Adulticide.

### DILUTION CALCULATIONS

For a 4% Sumithrin product, dilute 1 gallon DUET Dual-action Adulticide with 0.25 gallon oil. Finished spray contains 0.3 lbs Sumithrin & PBO and 0.06 pounds Prallethrin per gallon.

Dosage Description	Pounds a.i./Acre		Fluid oz. finished spray/Acre	Flow Rates in fluid oz./minute at truck speeds of:			
	Prallethrin	Sumithrin®		5 MPH	10 MPH	15 MPH	20 MPH
High Population	0.00072	0.0036	0.0036	1.54	4.7	9.3	14.0
Recommended	0.00044	0.0022	0.0022	0.94	2.8	5.7	8.5
Light	0.00036	0.0018	0.0018	0.77	2.3	4.7	7.0
Population	0.00024	0.0012	0.0012	0.51	1.6	3.1	4.7

For a 2.5% Sumithrin product, dilute 1 gallon DUET Dual-action Adulticide with 1 gallon oil. Finished spray contains 0.1875 lbs Sumithrin & PBO and 0.038 pounds Prallethrin per gallon

Dosage Description	Pounds a.i./Acre		Fluid oz. finished spray/Acre	Flow Rates in fluid oz./minute at truck speeds of:			
	Prallethrin	Sumithrin®		5 MPH	10 MPH	15 MPH	20 MPH
High Population	0.00072	0.0036	0.0036	2.46	7.4	14.9	22.3
Recommended	0.00044	0.0022	0.0022	1.50	4.6	9.1	13.7
Light	0.00036	0.0018	0.0018	1.23	3.7	7.4	11.2
Population	0.00024	0.0012	0.0012	0.82	2.5	5.0	7.4

For a 2% Sumithrin product, dilute 1 gallon DUET Dual-action Adulticide with 1.5 gallons oil. Finished spray contains 0.15 lbs Sumithrin & PBO and 0.03 pounds Prallethrin per gallon

Dosage Description	Pounds a.i./Acre		Fluid oz. finished spray/Acre	Flow Rates in fluid oz./minute at truck speeds of:			
	Prallethrin	Sumithrin®		5 MPH	10 MPH	15 MPH	20 MPH
High Population	0.00072	0.0036	0.0036	3.07	9.3	18.6	27.9
Recommended	0.00044	0.0022	0.0022	1.88	5.7	11.4	17.1
Light	0.00036	0.0018	0.0018	1.54	4.7	9.3	14.0
Population	0.00024	0.0012	0.0012	1.02	3.1	6.2	9.3

### STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Store in a cool, dry place. Keep container closed.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL FOR REFILLABLE DRUMS AND TOTES: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into rinsate collection system. Repeat this rinsing procedure two more times. Offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

CONTAINER DISPOSAL FOR NONREFILLABLE CONTAINERS: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

TRIPLE RINSE AS FOLLOWS: (CONTAINERS 5 GALLONS CAPACITY OR SMALLER): Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ full with mineral oil and recap. Shake for 10 seconds. Pour rinsate into application equipment or a rinse tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. (CONTAINERS LARGER THAN 5 GALLONS CAPACITY): Empty the remaining contents into the application equipment or a mix tank. Fill the container ¼ full with mineral oil. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

NOTICE: To the extent provided by law, seller makes no warranty, expressed or implied concerning the use of this product other than as indicated on the label. Buyer assumes all risk of use and/or handling of this material when use and/or handling is contrary to label instructions.

DUET™ is a Trademark of Clarke Mosquito Control Products, Inc.

Sumithrin™ is a Trademark of Sumitomo Company, Ltd.

FOR MORE INFORMATION CALL: 1-800-323-5727

Manufactured For

CLARKE MOSQUITO CONTROL PRODUCTS, INC.

159 N. Garden Ave.

Roselle, Illinois 60172 U.S.A.

EPA Reg. No.: 1021-1795-8329

Net Contents:

EPA Est. No.: 8329-IL-01

Lot/Batch:



**25%**  
**MORE**  
Coverage\*

# WEED B GON® MAX™ CONCENTRATE

## KILLS WEEDS, NOT LAWNS™

**100%**  
ROOT KILL

RESULTS IN  
**24** HOURS

KILLS OVER  
**250** WEEDS

ACTIVE Ingredients

Dimethylamine Salt of 2-Methyl-4-	
Chlorophenoxyacetic Acid*	..... 13.72%
Triethylamine Salt of 3,5,6-	
Trichloro-2-Pyridinyl oxyacetic Acid**.	1.56%
Dimethylamine Salt of Dicamba	
(3,6-Dichloro-o-Anisic Acid)*** .....	1.35%
OTHER INGREDIENTS.....	83.37%
TOTAL .....	100.00%

KEEP OUT OF REACH OF CHILDREN  
**WARNING** • SEE BACK PANEL FOR ADDITIONAL  
PRECAUTIONARY STATEMENTS.

NET 32 FL OZ (1 QT)  
946 mL



KILLS THE  
**TOUGHEST**  
WEEDS!



**STORAGE AND DISPOSAL****STORAGE**

To be stored in original container and placed in an area inaccessible to children.

**DISPOSAL**

**If empty**—Do not reuse this container. Place in trash or offer for recycling if available. **If partly filled**—if product cannot be used as directed, call your local solid waste agency or 1-800-CLEANUP for disposal instructions. Never place unused product down any indoor (including toilet) or outdoor (including sewer) drain.

**PRECAUTIONARY STATEMENTS****HAZARDS TO HUMANS & DOMESTIC ANIMALS****WARNING:**

- Causes substantial but temporary eye injury.
- Harmful if swallowed.
- Do not get in eyes, on skin or on clothing.
- Wear goggles, face shield or safety glasses when mixing, pouring this concentrate from one container to another and when removing or reattaching container closure/spray nozzle.
- After product has been diluted in accordance with Directions for Use, eye protection is not required.
- Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

**FIRST AID STATEMENT**

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

**IF IN EYES**

Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

**IF SWALLOWED**

Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

**NOTE TO PHYSICIAN**

Probable mucosal damage may contraindicate the use of gastric lavage.

**ORTHO®****WEED B GON® MAX™****CONCENTRATE****GUARANTEED RESULTS!†**

**How it works:** Ortho® Weed-B-Gon® MAX™ Concentrate contains an exclusive blend of ingredients scientifically proven to kill even the toughest lawn weeds down to the roots. And its revolutionary formula won't harm your lawn—guaranteed! When used as directed.

**PRODUCT FACTS** Treats up to 16,000 square feet

KILLS WEEDS	Kills over 250 weeds including: dandelion, chickweed, clover, ground ivy, (creeping Charlie), oxalis, wild violet & other tough lawn weeds.
WHERE TO USE	<b>ON LAWNS</b> Fescue, Kentucky bluegrass, perennial ryegrass, zoysia grass, bentgrass, bahiagrass and Bermudagrass. <b>DO NOT USE</b> on St. Augustine or centipede lawns. For St. Augustine or centipede lawns use <b>Weed-B-Gon Spot Weed Killer</b> for St. Augustine Lawns or <b>Weed-B-Gon MAX Ready-to-Use</b> .
AMOUNT TO USE	For northern grasses (Fescues, Kentucky bluegrass, perennial ryegrass and zoysia grass) 2 fl. oz. per 1 gallon of water for each 500 sq. ft.
	For southern grasses (bent, bahia and Bermuda)— <b>DO NOT USE</b> on St. Augustine and centipede lawns: 1 fl. oz. per 1 gallon of water for each 500 sq. ft.



Questions, Comments or Medical Information?  
Call 1-800-225-2883 [www.ortho.com](http://www.ortho.com)



\*vs. previous Weed-B-Gon formula

By Isomer Specific Method, Equivalent To:

*2-Methyl-4-Chlorophenoxyacetic Acid .....	11.20%, 0.970 lbs./gal.
**3,5,6-Trichloro-2-Pyridinylacetic Acid .....	11.12%, 0.097 lbs./gal.
***3,6-Dichloro-o-Anisic Acid .....	11.12%, 0.097 lbs./gal.

Manufactured for The ORTHO Group  
P.O. BOX 190 Marysville, OH 43040

Form LB10132G000

EPA Reg. No. 228-424-239

EPA Est. 239-IA-3<sup>a</sup>, 58969-MO-1<sup>a</sup>

Superscript is first letter of lot number  
Made in USA



80% SIZE  
12-digit UPC  
(non-suppressed)  
For Position Only  
0 7 1 5 4 9 0 4 1 0 1 X  
1035

## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read entire label before using this product. Use strictly in accordance with label precautionary statements and directions.

## FOR BEST RESULTS

### BEFORE YOU APPLY

- Do not mow for 1 to 2 days before or after application.
- If soil is dry, water before application.
- To treat the entire lawn (broadcast application): Use a tank sprayer or hose-end sprayer. Measure lawn and calculate square feet by multiplying length times width. Spray evenly over measured area.

### MIXING INSTRUCTIONS

1 Tablespoon (Tbs) = 3 teaspoons (tsp)  
1 fl oz = 2 Tbs

### IDENTIFY YOUR GRASS

#### NORTHERN GRASSES:

Fescues, Kentucky bluegrass, perennial rye and zoysia

#### SOUTHERN GRASSES:

Bent, bahia and Bermuda  
(DO NOT USE on St. Augustine or centipede lawns)

### WHEN USING A TANK SPRAYER

- Add 2 fl.oz. per gallon of water for each 500 sq. ft.

- Add 1 fl. oz. per gallon of water for each 500 sq. ft.

### WHEN USING AN ORTHO® DIAL'N SPRAY® APPLICATOR

- Set dial to 1 oz.
- Add 8 oz. of concentrate directly into sprayer jar. DO NOT ADD WATER.
- Spray evenly over 2,000 sq. ft.
- Any unused product should be poured back into its original container.
- Set dial to 1 Tbs.
- Add 8 oz. of concentrate directly into sprayer jar. DO NOT ADD WATER.
- Spray evenly over 4,000 sq. ft.
- Any unused product should be poured back into its original container.

### HOW TO APPLY

**To spot treat individual lawn weeds:** Use a tank sprayer and spray to wet weeds. To reduce spray drift, adjust sprayer nozzle to deliver a coarse spray.  
**For broadcast application—use Ortho® DIAL 'N SPRAY® applicator**—Spray evenly over 2,000 sq. ft. (4,000 sq. ft. for Southern lawns) until jar is empty. After spraying with Ortho® Dial 'N Spray® applicator, any unused product should be poured back into its original container.

### WHEN TO APPLY

- Spray when weeds are actively growing.
- Spray when temperature is below 90°F.
- Spray when air is calm to avoid drift to vegetables, flowers, ornamental plants, trees, shrubs and other desirable plants.
- Do not apply to newly seeded grasses until well established (they have been mowed 3 times).
- Rain-Proof!™ BRAND — Rain or watering 1 hour after application will not wash away effectiveness.
- Reseed no sooner than 3 weeks after application.

## IMPORTANT

- For use on Bluegrass, Fescues, Rye, Bent, Bermuda, Bahia and Zoysia lawns.
- DO NOT USE on St. Augustine and Centipede lawns.
- Do not spray Carpet grass, Dichondra or desirable clovers.
- May cause temporary yellowing of some Bermudagrass turf.
- Do not exceed specified dosages for any area.
- Be particularly careful applying within the drip line of trees and other ornamental species.
- Avoid contact with exposed feeder roots of ornamentals and trees.

## WEEDS

Alder, Annual yellow sweet clover, Artichoke, Aster, Austrian fielddress, Bedstraw, Beggartick, Biden, Bindweed, Bird's nest, Bitterweed, Bitter wintercress, Black-eyed Susan, Black medic, Black mustard, Blackseed pantain, Blessed thistle, Blue lettuce, Blue vervain, Box elder, Bracted plantain, Brassbuttons, Bristly oxtongue, Broadleaf doc, Broadleaf plantain, Broomweed, Buckhorn, Buckhorn plantain, Bulbous buttercup, Bull nettle, Bull thistle, Burdock, Burning nettle, But ragweed, Burweed, Buttercup, Canada thistle, Carolina geranium, Carpetweed, Catchweed bedstraw, Catsear, Catnip, Chickweed, Chicory, Cinquefoil, Clover, Cockle, Cocklebur, Coffeebean, Coffeeweed, Common chickweed, Common mullein, Common sowthistle, Corn chamomile, Creeping jenny, Crimson clover, Croton, Cudweed, Curly dock, Curly indigo, Dandelion, Dead nettle, Dock, Dogbane, Dogfennel, Elderberry, English daisy, Fall dandelion, False dandelion, False flax, False sunflower, Fiddleneck, Field bindweed, Field pansy, Flea bane (daisy), Flixweed, Florida betony, Florida pusley, Frenchweed, Galinsoga, Garlic mustard, Goathead, Goatsbeard, Goldenrod, Ground ivy, Gumweed, Hairy bittercress, Hairy fleabane, Hawkweed, Healall, Heartleaf drymaly, Hedge bindweed, Hedge mustard, Hemp, Henbit, Hoary cress, Hoary plantain, Hoary vervain, Honeysuckle, Hop clover, Horse nettle, Horsetail, Indiana mallow, Ironweed, Jewelweed, Jimsonweed, Kochia, Knawel, Knotweed, Lambsquarter, Lespedeza, Locoweed, Lupine, Mallow, Marshelder, Matchweed, Mexicanweed, Milk vetch, Milkweed bloodflower, Mugwort, Morning glory, Mouseear chickweed, Musk thistle, Mustard, Narrowleaf plantain, Narrowleaf vetch, Nettle, Orange hawkweed, Oxalis, Oxyeye daisy, Parsley-piert, Parsnip, Pearlwort, Pennyroyal, Pennywort, Peppergrass, Pepperweed, Pigweed, Pineywoods bedstraw, Plains coreopsis, Plantain, Poison hemlock, Poison ivy, Poison oak, Pokeweed, Poor Joe, Povertyweed, Prairie, Prickly lettuce, Prickly sida, Primrose, Prostrate knotweed, Prostrate pigweed, Prostrate spurge, Prostrate vervain, Puncture vine, Purslane, Ragweed, Red clover, Redroot pigweed, Red sorrel, Redstem filaree, Rough cinquefoil, Rough fleabane, Roundleafed marigold, Rush, Russian pigweed, Russian thistle, St. Johnswort, Scarlet pimpernel, Scotch thistle, Sheep sorrel, Shepherdspurse, Slender plantain, Smallflower galinsoga, Smartweed, Smooth dock, Smooth pigweed, Sneezeweed, Southern wild rose, Sowthistle, Spanishneedle, Spatterdock, Speedwell, Spiny, Spiny Amaranth, Spiny cocklebur, Spotted catsear, Spotted knapweed, Spotted spurge, Spurge, Spurweed, Stinging nettle, Stinkweed, Stitchwort, Strawberry clover, Sumac, Sunflower, Sweet clover, Tall nettle, Tall vervain, Tansy mustard, Tansy ragwort, Tanweed, Tarweed, Thistle, Tick trefoil, Toadflax, Trailing crownvetch, Tumble mustard, Tumble pigweed, Tumbleweed, Velvet leaf, Venice mallow, Veronica, Vervain, Vetch, Virginia buttonweed, Virginia creeper, Virginia pepperweed, Waveleaf bulrush, Western clematis, Western salsify, White clover, White mustard, Wild mustard, Wild aster, Wild buckwheat, Wild carrot, Wild four-o'clock, Wild garlic, Wild geranium, Wild lettuce, Wild marigold, Wild onion, Wild parsnip, Wild radish, Wild rape, Wild strawberry, Wild sweet potato, Wild vetch, Willow, Witchweed, Wooly morning glory, Woodsorrel, Wooly croton, Wooly plantain, Wormseed, Yarrow, Yellow rocket, Yellowflower pepperweed, and other broadleaf weeds.

## ENVIRONMENTAL HAZARDS

- Drift or runoff may adversely affect nontarget plants.
- Do not apply directly to water. When cleaning equipment, do not pour washwater on the ground; spray or drain over a large area away from wells and other water sources. Do not contaminate water when disposing of equipment washwaters.
- Do not apply this product through any type of irrigation system.
- Do not contaminate water used for irrigation or domestic purposes.
- Most cases of ground water contamination involving phenoxy herbicides such as MCPA have been associated with mixing/loading and disposal sites. Caution should be exercised when handling these phenoxy pesticides at such sites to prevent contamination of groundwater supplies. Use of closed systems for mixing and transferring this pesticide will reduce the probability of spills.
- Placement of the mixing/loading equipment on an impervious pad to contain spills will help prevent groundwater contamination.

**NOTICE:** Buyer assumes all risks of use, storage or handling of this product not in accordance with directions.

### **†The ORTHO Guarantee**

If for any reason you are not satisfied with this product, mail us proof of purchase to obtain a full refund of your purchase price.



Questions, Comments or Medical Information?

Call 1-800-225-2883



[www.ortho.com](http://www.ortho.com)

### Selective Broadleaf Weed Control in Residential Turf

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Manufactured for

The ORTHO Group

P.O. Box 190, Marysville, OH 43040

Form LB10132G000

EPA Reg. No. 228-424-239

EPA Est. 239-IA-3<sup>A</sup>, 58996-MO-1<sup>A</sup>

Superscript is first letter of lot number

Made in USA

PULL HERE TO OPEN ►



# Reward®

## Landscape and Aquatic Herbicide

**TO PREVENT ACCIDENTAL POISONING, NEVER PUT INTO FOOD, DRINK, OR OTHER CONTAINERS, AND USE STRICTLY IN ACCORDANCE WITH ENTIRE LABEL.**

**DO NOT USE THIS PRODUCT FOR REFORMULATION.**

*Active Ingredient:*

Diquat dibromide [6,7-dihydrodipyrido (1,2-a:2',1'-c) pyrazinediium dibromide] ..... 37.3%

*Other Ingredients:*

Total: 62.7%

100.0%

Contains 2 lbs. diquat cation per gal. (3.73 lbs. diquat dibromide per gal.)

**KEEP OUT OF REACH OF CHILDREN.**

## CAUTION

*See additional precautionary statements on label.*

EPA Reg. No. 100-1091

EPA Est. 100-LA-001

Product of United Kingdom

Formulated in the USA

SCP 1091A-L2E 0508  
264067

**2.5 gallons**

Net Contents

**syngenta®**

FIRST AID	
If inhaled	<ul style="list-style-type: none"> <li>Move person to fresh air.</li> <li>If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.</li> <li>Call a poison control center or doctor for further treatment advice.</li> </ul>
If swallowed	<ul style="list-style-type: none"> <li>Call a poison control center or doctor immediately for treatment advice.</li> <li>Have person sip a glass of water if able to swallow.</li> <li>Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>Do not give anything by mouth to an unconscious person.</li> </ul>
If in eyes	<ul style="list-style-type: none"> <li>Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
If on skin or clothing	<ul style="list-style-type: none"> <li>Take off contaminated clothing.</li> <li>Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
<b>NOTE TO PHYSICIANS</b>	
To be effective, treatment for diquat poisoning must begin IMMEDIATELY. Treatment consists of binding diquat in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination, and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
<b>HOTLINE NUMBER</b> For 24-Hour Medical Emergency Assistance (Human or Animal) or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident), Call <b>1-800-888-8372</b>	

## PRECAUTIONARY STATEMENTS

### Hazards to Humans and Domestic Animals

### CAUTION

Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist. Avoid contact with eyes, skin, or clothing.

*continued...*

## **PRECAUTIONARY STATEMENTS (*continued*)**

### **Personal Protective Equipment (PPE)**

Some materials that are chemical-resistant to this product are: barrier laminate, butyl rubber ≥14 mils, nitrile rubber ≥14 mils. If you want more options, follow the instructions for Category A on an EPA Chemical Resistance Category Selection Chart.

#### **Mixers, Loaders, Applicators and other handlers must wear:**

- Coveralls over short-sleeved shirt and short pants or coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, or loading
- Face shield when mixing or loading

**Exception:** After this product has been diluted to 0.50% Reward or less in water (i.e., the labeled rate for some spot applications), applicators for AQUATIC SURFACE APPLICATIONS must, at a minimum, wear (Note - Mixers and Loaders for this application method must still wear the personal protective equipment (PPE) as described in the above section):

- Long-sleeved shirt and long pants
- Shoes plus socks
- Waterproof gloves
- Protective eyewear

**Exception:** At a minimum, applicators for AQUATIC SUBSURFACE APPLICATIONS must wear (Note - Mixers and Loaders for this application method must still wear the personal protective equipment (PPE) as described in the above section):

- Short-sleeved shirt and short pants
- Waterproof gloves
- Chemical-resistant footwear plus socks

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

### **Engineering Control Statements**

Mixers and loaders supporting aerial applications are required to use closed systems that provide dermal protection. The closed system must be used in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4)]. When using the closed system, mixers and loaders PPE requirements may be reduced or modified as specified in the WPS.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

### User Safety Recommendations

#### Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Prolonged contact of the product with the skin may produce burns.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

### Environmental Hazards

This pesticide is toxic to aquatic invertebrates. **For Terrestrial Uses**, do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash water. **For Aquatic Uses** do not apply directly to water except as specified on this label.

## CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

**NOTICE:** Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of SYNGENTA CROP PROTECTION, Inc. or Seller. To the extent permitted by applicable law, Buyer and User agree to hold SYNGENTA and Seller harmless for any claims relating to such factors.

SYNGENTA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. To the extent permitted by applicable law: (1) this warranty does not extend to the use of the product contrary to label instructions or under conditions not reasonably foreseeable to or beyond the control of Seller or SYNGENTA, and, (2) Buyer and User assume the risk of any such use. To the extent permitted by applicable law, SYNGENTA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS WARRANTED BY THIS LABEL.

To the extent permitted by applicable law, in no event shall SYNGENTA be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF SYNGENTA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF SYNGENTA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

SYNGENTA and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitation of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of SYNGENTA.

## DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

**READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.**

**Do not apply this product through any type of irrigation system.**

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

**Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 24 hours.**

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls over short-sleeved shirt and short pants, or coveralls over long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure

### **NON-AGRICULTURAL USE REQUIREMENTS**

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

**Keep all unprotected persons out of operating areas or vicinity where there may be drift.**

**For terrestrial uses,** do not enter or allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew, or rain, without appropriate protective clothing until spray has dried.

**For aquatic uses,** do not enter treated areas while treatments are in progress.

### **SPECIFIC USE DIRECTIONS**

Reward Landscape and Aquatic Herbicide is a nonvolatile herbicidal chemical for use as a general herbicide to control weeds in commercial greenhouses and nurseries; ornamental seed crops (flowers, bulbs, etc. – except in the state of California); landscape, industrial, recreational, commercial, residential, and public areas; turf renovation (all turf areas except commercial sod farms); dormant established turfgrass (bermudagrass, zoysiagrass – nonfood or feed crop); and aquatic areas. Absorption and herbicidal action is usually quite rapid with effects visible in a few days. Reward Landscape and Aquatic Herbicide controls weeds by interfering with photosynthesis within green plant tissue. Weed plants should be succulent and actively growing for best results. Rinse all spray equipment thoroughly with water after use. Avoid spray drift to crops, ornamentals, and other desirable plants during application, as injury may result. Application to muddy water may result in reduced control. Minimize creating muddy water during application. Use of dirty or muddy water for Reward Landscape and Aquatic Herbicide dilution may result in reduced herbicidal activity. Avoid applying under conditions of high wind, water flow, or wave action.

### **SPRAY DRIFT MANAGEMENT**

Avoiding spray drift at the application site is the responsibility of the applicator and the grower. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses, or to applications using dry formulations.

- The distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
- Nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees.

Where states have more stringent regulations, they should be observed.

## **Droplet Size**

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (See **Wind, Temperature and Humidity, and Temperature Inversions**).

### **Controlling Droplet Size**

- **Volume** – Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** – Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** – Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** – Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** – Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

## **Boom Length**

For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

## **Application Height**

Applications should not be made at a height greater than 10 ft. above the top of the target plants, unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

## **Swath Adjustment**

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller drops, etc.).

## **Wind**

Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

## **Temperature and Humidity**

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

## **Temperature Inversions**

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

## **Sensitive Areas**

The pesticide should only be applied when the wind is blowing away from adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, nontarget crops).

## **COMMERCIAL GREENHOUSES AND NURSERIES**

For general weed control in commercial greenhouses (beneath benches), field grown and container stock, and other similar areas, Reward Landscape and Aquatic Herbicide may be applied preplant or postplant preemergence in field grown ornamental nursery plantings or postemergence as a directed spray. Reward Landscape and Aquatic Herbicide may also be applied preemergence in ornamental seed crops (except in the state of California). Avoid contact with desirable foliage as injury may occur. Do not use on food or feed crops.

**Spot spray:** 1-2 qts. Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 100 gals. of water, or 0.75 oz. (22 mls.) Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 1 gal. of water.

**Broadcast:** 1-2 pts. Reward Landscape and Aquatic Herbicide in a minimum of 15 gals. of water per acre. Add the labeled rate of a 75% or greater nonionic surfactant per 100 gals. of spray mixture. Use an adequate spray volume to insure good coverage.

## **ORNAMENTAL SEED CROPS (FLOWERS, BULBS, ETC.) EXCEPT IN THE STATE OF CALIFORNIA**

For preharvest desiccation of ornamental seed crops. NOT FOR FOOD OR FIBER CROPS.

**Broadcast (Air or Ground):** 1.5-2 pts. Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per acre in sufficient water (minimum of 5 gals. by air; 15 gals. by ground) for desiccation and weed burndown. Repeat as needed at no less than 5-day intervals up to three applications. Do not use seed, screenings, or waste as feed or for consumption.

## **DIRECTIONS FOR LANDSCAPE, INDUSTRIAL, RECREATIONAL, COMMERCIAL, RESIDENTIAL, AND PUBLIC AREAS**

Reward Landscape and Aquatic Herbicide provides fast control of broadleaf and grassy weeds in industrial, recreational, golf course, commercial, residential, and public areas.

Reward Landscape and Aquatic Herbicide is a nonselective herbicide that rapidly kills undesirable above ground weed growth in 24-36 hours. Avoid application of Reward Landscape and Aquatic Herbicide to desirable plants.

Reward Landscape and Aquatic Herbicide is a contact/desiccant herbicide; it is essential to obtain complete coverage of the target weeds to get good control. Improper application technique and/or application to stressed weeds may result in unacceptable weed control. For best results, apply to actively growing, young weeds.

Difficult weeds (such as perennial or deeply-rooted weeds) can often be controlled by tank mixing Reward Landscape and Aquatic Herbicide with other systemic-type herbicides. Refer to other product labels for specific application directions.

For residual weed control, tank mix Reward Landscape and Aquatic Herbicide with a preemergent herbicide labeled for the intended use site. When mixing Reward Landscape and Aquatic Herbicide with another herbicide, it is recommended to mix just a small amount first to determine if the mixture is physically compatible before proceeding with larger volumes.

Syngenta has not tested all possible tank mixtures with other herbicides for compatibility, efficacy or other adverse effects. Before mixing with other herbicides Syngenta recommends you first consult your state experimental station, state university or extension agent.

**Grounds maintenance weed control:** Reward Landscape and Aquatic Herbicide can be used as a spot or broadcast spray to control weeds in public, commercial and residential landscapes, including landscape beds, lawns, golf courses and roadsides. Reward Landscape and Aquatic Herbicide can also be used for weed control around the edges and nonflooded portions of ponds, lakes and ditches.

**Trim and Edge weed control:** Reward Landscape and Aquatic Herbicide can be used to eliminate undesired grass and broadleaf plant growth in a narrow band along driveways, walkways, patios, cart paths, fence lines, and around trees, ornamental gardens, buildings, other structures, and beneath noncommercial greenhouse benches. Vegetation control with Reward Landscape and Aquatic Herbicide is limited to the spray application width. Do not exceed the labeled rate of Reward Landscape and Aquatic Herbicide as excessive rates may result in staining of concrete-based materials.

Reward Landscape and Aquatic Herbicide, since it does not translocate systemically, can be used as an edging or pruning tool when precisely applied to select areas of grass or to undesirable growth on desirable ornamental bedding plants, ground covers, etc.

**Industrial weed control:** Reward Landscape and Aquatic Herbicide can be used as a spot or broadcast spray either alone or in combination with other herbicides as a fast burndown or control weeds in rights-of-ways, railroad beds/yards, highways, roads, dividers and medians, parking lots, pipelines, pumping stations, public utility lines, transformer stations and substations, electric utilities, storage yards, and other non-crop areas.

**Spot spray:** Apply either 1-2 qts. of Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 100 gals. water, or 0.75 oz. (22 mls.) Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 1 gal. of water.

**Broadcast:** 1-2 pts. Reward Landscape and Aquatic Herbicide per acre in sufficient water to insure good spray coverage. Add the labeled rate of 75% or greater nonionic surfactant per 100 gals. spray mixture. Greater water volumes are necessary if the target plants are tall and/or dense. It is recommended that 60 gals. or greater water volume be used to obtain good coverage of dense weeds.

#### **TURF RENOVATION (ALL TURF AREAS EXCEPT COMMERCIAL SOD FARMS)**

To desiccate golf course turf and other turf areas prior to renovation, apply 1-2 pts. of Reward Landscape and Aquatic Herbicide per acre plus the labeled rate of a 75% or greater nonionic surfactant in 20-100 gals. of water (4 teaspoons of Reward Landscape and Aquatic Herbicide plus the labeled rate of a 75% or greater nonionic surfactant per 1 gal. of water) using ground spray equipment. Apply for full coverage and thorough contact with the turfgrass. Apply only when the turf is dry, free from dew and incidental moisture. For enhanced turf desiccation, especially in the case of thick turfgrass, water volumes should approach 100 gals. of water per acre.

For **suppression** of regrowth and quick desiccation of treated turfgrass, Reward Landscape and Aquatic Herbicide may be mixed with other systemic nonselective or systemic postemergence grassy weed herbicides. Refer to other product labels for specific application directions and restrictions.

Avoid spray contact with, or spray drift to, foliage of ornamental plants or food crops.

Do not graze livestock on treated turf or feed treated thatch to livestock.

#### **DORMANT ESTABLISHED TURFGRASS (BERMUDAGRASS, ZOYSIAGRASS), NONFOOD OR FEED CROP**

For control of emerged annual broadleaf and grass weeds, including Little Barley\*, Annual Bluegrass, Bromes including Rescuergrass, Sixweeks fescue, Henbit, Buttercup, and Carolina Geranium in established dormant bermudagrass lawns, parks, golf courses, etc.

Apply 1-2 pts. Reward Landscape and Aquatic Herbicide per acre in 20-100 gals. of spray mix by ground as a broadcast application. Add the labeled rate of a 75% or greater nonionic surfactant per 100 gals. of spray mixture.

Bermudagrass must be dormant at application. Application to actively growing bermudagrass may cause delay or permanent injury. Users in the extreme Southern areas should be attentive to the extent of dormancy at the time of application.

\*For control of Little Barley, apply Reward Landscape and Aquatic Herbicide prior to the mid-boot stage.

#### **AQUATIC USE DIRECTIONS**

##### **New York – Not for Sale or Use in New York State without Supplemental Special Local Needs Labeling.**

Necessary approval and/or permits must be obtained prior to application if required. Consult the responsible State Agencies (i.e., Fish and Game Agencies, State Water Conservation authorities, or Department of Natural Resources).

Treatment of dense weed areas may result in oxygen loss from decomposition of dead weeds. This loss of oxygen may cause fish suffocation. Therefore, treat only 1/3 to 1/2 of the water body area at one time and wait 14 days between treatments.

For best results on submersed weeds, Reward Landscape and Aquatic Herbicide should be applied to actively growing (photosynthesizing) weeds when water temperatures have reached or exceeded approximately 50°F, typically during the Spring or early Summer.

For application only to **still water** (i.e. ponds, lakes, and drainage ditches) where there is minimal or no outflow to public waters.

and/or

For applications to **public waters** in ponds, lakes, reservoirs, marshes, bayous, drainage ditches, canals, streams, rivers, and other slow-moving or quiescent bodies of water for control of aquatic weeds. For use by:

- Corps of Engineers; or
- Federal or State Public Agencies (i.e., Water Management District personnel, municipal officials); or
- Applicators and/or Licensees (certified for aquatic pest control) that are authorized by the State or Local government.

Treated water may be used according to the following table or until such time as an approved assay (example: PAM II Spectromatic Method) shows that the water does not contain more than the designated maximum contaminant level goal (MCLG) of 0.02 mg/l. (ppm) of diquat dibromide (calculated as the cation).

#### **Water Use Restrictions Following Applications With Reward Landscape And Aquatic Herbicide (Days)**

Application Rate	Drinking	Fishing and Swimming	Livestock/ Domestic Animals Consumption	Spray Tank Applications** and Irrigation to Turf and Landscape Ornamentals	Spray Tank Applications** and Irrigation to Food Crops and Production Ornamentals
2 gals./surface acre	3 days	0	1 day	3 days	5 days
1 gal./surface acre	2 days	0	1 day	2 days	5 days
0.75 gal./surface acre	2 days	0	1 day	2 days	5 days
0.50 gal./surface acre	1 day	0	1 day	1 day	5 days
<b>Spot Spray*</b> (< 0.5 gal./surface acre)	1 day	0	1 day	1 day	5 days

\*Add a nonionic surfactant (with at least 75% of the constituents active as a spray adjuvant) at the rate recommended by the manufacturer.

\*\*For preparing agricultural sprays for food crops, turf or ornamentals (to prevent phytotoxicity), do not use water treated with Reward Landscape and Aquatic Herbicide before the specified time period.

When the contents of more than one spray tank is necessary to complete a single aquatic application, no water holding restrictions apply between the consecutive spray tanks.

No applications are to be made in areas where commercial processing of fish, resulting in the production of fish protein concentrate or fish meal, is practiced. Before application, coordination and approval of local and/or State authorities must be obtained.

### **Floating and Marginal Weeds Including:**

Water lettuce, *Pistia stratiotes*

Water hyacinth, *Eichhornia crassipes*

Duckweed, *Lemna* spp.

*Salvinia* spp. (including *S. molesta*)

Pennywort (*Hydrocotyle* spp.)

Frog's Bit<sup>1</sup>, *Limnobium spongia*

Cattails, *Typha* spp.

<sup>1</sup>Not for use in California

Reward Landscape and Aquatic Herbicide may be applied by backpack, airboat, spray handgun, helicopter, airplane, or similar application equipment that results in thorough spray coverage.

**Spot Treatment:** Apply Reward Landscape and Aquatic Herbicide at 2 quarts per 100 gallons spray carrier (0.5% solution) with an approved aquatic wetting agent at 0.25-1.0% v/v (1 quart to 1 gallon per 100 gallons water). For cattail control, Reward Landscape and Aquatic Herbicide should be applied prior to flowering at the maximum application rate (8 quarts of Reward Landscape and Aquatic Herbicide/100 gallons spray carrier) plus the wetting agent. Repeat treatments may be necessary for complete control.

Spray to completely wet target weeds but not to runoff. Densely packed weeds or mats may require additional applications due to incomplete spray coverage. Re-treat as needed. For best results, re-treat weed escapes within 2 weeks of the initial treatment.

**Broadcast Treatment:** Apply Reward Landscape and Aquatic Herbicide at the rate of 0.5-2.0 gallons per surface acre in sufficient carrier along with 16-32 oz./A of an approved wetting agent. Re-treat as necessary for densely populated weed areas. Good coverage is necessary for control of the target weeds.

For duckweed control, apply Reward Landscape and Aquatic Herbicide at 1-2 gallons/A.

### **Submersed Weeds Including:**

Bladderwort, *Utricularia* spp.

Hydrilla, *Hydrilla verticillata*

Watermilfoils (including Eurasian), *Myriophyllum* spp.

Pondweeds<sup>1</sup>, *Potamogeton* spp.

Coontail, *Ceratophyllum demersum*

Elodea, *Elodea* spp.

Brazilian Elodea, *Egeria densa*

Naiad, *Najas* spp.

Algae<sup>2</sup>, *Spirogyra* spp. and *Pithophora* spp.

<sup>1</sup>Reward Landscape and Aquatic Herbicide controls *Potamogeton* species except Richardson's pondweed, *P. richardsonii*.

<sup>2</sup>Suppression only. For control of *Spirogyra* and/or *Pithophora*, use Reward Landscape and Aquatic Herbicide in a tank mix with an approved algaecide.

For severe weed or algae infestations, the use of an approved algaecide either as a pretreatment to the Reward Landscape and Aquatic Herbicide application or in a tank mix, may result in enhanced weed control.

To control submersed weeds, apply Reward Landscape and Aquatic Herbicide in water at 0.5-2.0 gallons per surface acre (per 4 foot water depth). For severe weed infestations, use the 2.0 gallon per surface acre rate. For best results, re-treat as necessary on 14-21 day intervals. The table below shows how many gallons of Reward Landscape and Aquatic Herbicide to apply per surface acre based on water depth.

	Gallons of Reward Landscape and Aquatic Herbicide per Surface Acre Average Water Depth			
	1 Foot	2 Feet	3 Feet	4 Feet
1 gallon/acre rate	0.25 gal.	0.50 gal.	0.75 gal.	1.0 gal.
2 gallon/acre rate	0.50 gal.	1.0 gal.	1.5 gals.	2.0 gals.

**Note:** For water depths of 2 feet or less including shorelines, do not exceed 1 gallon per surface acre.

**Subsurface Applications:** Where the submersed weed growth, especially Hydrilla, has reached the water surface, apply either in a water carrier or an invert emulsion through boom trailing hoses carrying nozzle tips to apply the dilute spray below the water surface to insure adequate coverage.

**Bottom Placement:** Where submersed weeds such as Hydrilla, Bladderwort, or Coontail have reached the water surface and/or where the water is slowly moving through the weed growth, the use of an invert emulsion carrier injecting diluted Reward Landscape and Aquatic Herbicide near the bottom with weighted hoses may improve control. The addition of a copper based algaecide may improve control. If algae are present along with the submersed weeds, a pretreatment with a copper based algaecide may improve overall control.

**Surface Application for Submerged Aquatic Weeds:** Apply the recommended rate of Reward Landscape and Aquatic Herbicide as a spray in sufficient carrier to fully cover the target area. Applications should be made to ensure complete coverage of the weed areas. In mixed weed populations, use the high rate of application as indicated by weeds present. For dense submersed weeds or water over 2 feet deep, a surface spray is not recommended (Reward Landscape and Aquatic Herbicide should be applied subsurface in these situations.)

If posting is required by your state or tribe – consult the agency responsible for pesticide regulations for specific details.

## STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

### Pesticide Storage

Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not contaminate feed, foodstuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F. For help with any spill, leak, fire, or exposure involving this material, call 1-800-888-8372.

### Pesticide Disposal

Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

### Container Disposal

Do not reuse container. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

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For non-emergency (e.g., current product information), call  
Syngenta Crop Protection at 1-800-334-9481.

Manufactured for:  
Syngenta Crop Protection, Inc.  
P. O. Box 18300  
Greensboro, North Carolina 27419-8300  
[www.syngenta-us.com](http://www.syngenta-us.com)

**SCP 1091A-L2E 0508  
264067**



## Reward<sup>®</sup>

### Landscape and Aquatic Herbicide

**TO PREVENT ACCIDENTAL POISONING,  
NEVER PUT INTO FOOD, DRINK, OR  
OTHER CONTAINERS, AND USE  
STRICTLY IN ACCORDANCE WITH  
ENTIRE LABEL.**

**DO NOT USE THIS PRODUCT FOR  
REFORMULATION.**

Active Ingredient:	
Diquat dibromide [6,7-dihydrodipyrido (1,2-a',1'-c) pyrazinediium dibromide] . . . . .	37.3%
Other Ingredients:	62.7%
Total:	100.0%

Contains 2 lbs. diquat cation per gal. (3.73 lbs. diquat dibromide per gal.)

See additional precautionary statements in booklet.

**AGRICULTURAL USE REQUIREMENTS**

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. Refer to supplemental labeling under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

EPA Reg. No. 100-1091  
EPA Est. 100-LA-001

Reward<sup>®</sup> and the Syngenta logo are trademarks of a Syngenta Group Company.  
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Product of United Kingdom  
Formulated in the USA  
Manufactured for:  
Syngenta Crop Protection, Inc.  
P. O. Box 18300  
Greensboro, North Carolina 24719-8300  
[www.syngenta-us.com](http://www.syngenta-us.com)

SCP 1091A-L2E 0508  
264067

# 2.5 gallons

Net Contents

BAR CODE # IS  
(01) 0 07 02941 73710  
LAST DIGIT IS CHECK DIGIT  
(Barcode type: UCC/EAN 128)

## KEEP OUT OF REACH OF CHILDREN. **CAUTION**

**FIRST AID**

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

If swallowed: Call poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

**NOTE TO PHYSICIANS:** To be effective, treatment for diquat poisoning must begin **IMMEDIATELY**. Treatment consists of binding diquat in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination, and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

**HOT LINE NUMBER:** For 24-Hour Medical Emergency Assistance (Human or Animal) or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident), Call 1-800-888-8372.

## PRECAUTIONARY STATEMENTS

**Hazards to Humans and Domestic Animals**

**CAUTION**

Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist. Avoid contact with eyes, skin, or clothing.

**Environmental Hazards:** This pesticide is toxic to aquatic invertebrates. For Terrestrial Uses, do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash water. For Aquatic Uses do not apply directly to water except as specified on this label.

## STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

**Pesticide Storage:** Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not contaminate feed, food-stuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F. For help with any spill, leak, fire, or exposure involving this material, call 1-800-888-8372.

**Pesticide Disposal:** Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**Container Disposal:** Do not reuse container. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

For minor spills, leaks, etc., follow all precautions indicated on this label and clean up immediately. Take special care to avoid contamination of equipment and facilities during cleanup procedures and disposal of wastes. In the event of a major spill, fire, or other emergency, call 1-800-888-8372, day or night.

**CONTAINER IS NOT SAFE FOR FOOD, FEED, OR  
DRINKING WATER!**

**syngenta<sup>®</sup>**

## ATTENTION:

This specimen label is provided for general information only.

- This pesticide product may not yet be available or approved for sale or use in your area.
- It is your responsibility to follow all Federal, state and local laws and regulations regarding the use of pesticides.
- Before using any pesticide, be sure the intended use is approved in your state or locality.
- Your state or locality may require additional precautions and instructions for use of this product that are not included here.
- Monsanto does not guarantee the completeness or accuracy of this specimen label. The information found in this label may differ from the information found on the product label. You must have the EPA approved labeling with you at the time of use and must read and follow all label directions.
- You should not base any use of a similar product on the precautions, instructions for use or other information you find here.
- Always follow the precautions and instructions for use on the label of the pesticide you are using.

2119514-25



### Complete Directions for Use in Aquatic and Other Non-crop Sites.

AVOID CONTACT OF HERBICIDE WITH FOLIAGE, STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, BECAUSE SEVERE INJURY OR DESTRUCTION MAY RESULT.

EPA Reg. No. 524-343

2009-2

GROUP	9	HERBICIDE
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Read the entire label before using this product.

Use only according to label instructions.

Not all products listed on this label are registered for use in California. Check the registration status of each product in California before using.

Read the "LIMIT OF WARRANTY AND LIABILITY" statement at the end of the label before buying or using. If terms are not acceptable, return at once unopened.

THIS IS AN END-USE PRODUCT. MONSANTO DOES NOT INTEND AND HAS NOT REGISTERED IT FOR REFORMULATION (OR REPACKAGING). SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

#### PRODUCT INFORMATION

### 1.0 INGREDIENTS

#### ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl)glycine, in the form of its isopropylamine salt.....	53.8%
OTHER INGREDIENTS:.....	46.2%
	100.0%

\*Contains 648 grams per liter or 5.4 pounds per U.S. gallon of the active ingredient glyphosate, in the form of its isopropylamine salt. Equivalent to 480 grams per liter or 4.0 pounds per U.S. gallon of the acid, glyphosate.

No license granted under any non-U.S. patent(s).

### 2.0 IMPORTANT PHONE NUMBERS

FOR PRODUCT INFORMATION OR ASSISTANCE IN USING THIS PRODUCT,  
CALL TOLL-FREE,  
1-800-332-3111.

IN CASE OF AN EMERGENCY INVOLVING THIS PRODUCT, OR FOR MEDICAL  
ASSISTANCE, CALL COLLECT, DAY OR NIGHT,  
(314) 694-4000.

### 3.0 PRECAUTIONARY STATEMENTS

#### 3.1 Hazards to Humans and Domestic Animals

Keep out of reach of children.

## CAUTION!

Remove contaminated clothing and wash clothing before reuse.  
Wash thoroughly with soap and water after handling.

### 3.2 Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of: SPILL or LEAK, soak up and remove to a landfill.

### 3.3 Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, fiberglass, plastic or plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

### DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling. This product can only be used in accordance with the Directions for Use on this label or in separately published Monsanto Supplemental Labeling. Supplemental labeling can be found on the [www.cdns.net](http://www.cdns.net) or [www.greenbook.net](http://www.greenbook.net) websites or obtained by contacting your Authorized Monsanto Retailer or Monsanto Company representative. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulations.

### 4.0 STORAGE AND DISPOSAL

Proper pesticide storage and disposal are essential to protect against exposure to people and the environment due to leaks and spills, excess product or waste, and vandalism. Do not allow this product to contaminate water, foodstuffs, feed or seed by storage and disposal.

**PESTICIDE STORAGE:** STORE ABOVE 5°F (-15°C) TO KEEP PRODUCT FROM CRYSTALLIZING. Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68°F (20°C) for several days to redissolve and roll or shake container or recirculate in mini-bulk containers to mix well before using. Store pesticides away from food, pet food, feed, seed, fertilizers, and veterinary supplies. Keep container closed to prevent spills and contamination.

**PESTICIDE DISPOSAL:** To avoid wastes, use all material in this container, including rinsate, by application according to label directions. If wastes cannot be avoided, offer remaining product to a waste disposal facility or pesticide disposal program. Such programs are often run by state or local governments or by industry. All disposal must be in accordance with applicable Federal, state and local regulations and procedures.

**CONTAINER HANDLING AND DISPOSAL:** See container label for container handling and disposal instructions and refilling limitations.

### 5.0 GENERAL INFORMATION (How This Product Works)

**Product Description:** This product is a postemergence, systemic herbicide with no residual soil activity. It gives broad-spectrum control of many annual weeds, perennial weeds, woody brush and trees. It is formulated as a water-soluble liquid and may be applied through standard equipment after dilution and mixing with water or other carriers according to label instructions.

**Time to Symptoms:** This product moves through the plant from the point of foliage contact to and into the root system. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts. Effects are visible on most annual weeds within 2 to 4 days, but on most perennial weeds may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow activity of this product and delay development of visual symptoms.

**Stage of Weeds:** Annual weeds are easiest to control when they are small. Best control of most perennial weeds is obtained when treatment is made at late growth stages approaching maturity. Refer to the "WEEDS CONTROLLED" sections for specific weed instructions. Always use the higher product application rate in the labeled range

when weed growth is heavy or dense, or when weeds are growing in an undisturbed (non-cultivated) area. Reduced weed control may result from treating weeds with disease or insect damage, weeds heavily covered with dust, or weeds under poor growing conditions.

**Cultural Considerations:** Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed or cut, and have not been allowed to regrow to the specified stage for treatment.

**Rainfastness:** Heavy rainfall soon after application may wash this product off of the foliage and a repeat application may be required for adequate control.

**Mode of Action in Plants:** The active ingredient in this product inhibits production of an enzyme in plants and microorganisms that is essential to formation of specific amino acids.

**No Soil Activity:** Weeds must be emerged at the time of application to be controlled by this product. Weeds germinating from seed after application will not be controlled. Unemerged plants arising from unattached underground rhizomes or rootstocks of perennials will not be affected by the herbicide and will continue to grow.

**Maximum Application Rates:** The maximum application or use rates stated throughout this label are given in units of volume (fluid ounces or quarts) of this product per acre. However, the maximum allowed application rates apply to this product combined with the use of any and all other herbicides containing the active ingredient glyphosate, whether applied separately or as tank mixtures, on a basis of total pounds of glyphosate (acid equivalents) per acre. If more than one glyphosate-containing product is applied to the same site within the same year, you must ensure that the total use of glyphosate (pounds acid equivalents) does not exceed the maximum allowed. The combined total of all treatments must not exceed 8 quarts of this product (8 pounds of glyphosate acid) per acre per year. See the "INGREDIENTS" section of this label for necessary product information.

#### ATTENTION

AVOID CONTACT OF HERBICIDE WITH FOLIAGE, STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, BECAUSE SEVERE INJURY OR DESTRUCTION MAY RESULT.

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended. The likelihood of injury occurring from the use of this product increases when winds are gusty, as wind velocity increases, when wind direction is constantly changing or when there are other meteorological conditions that favor spray drift. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) that are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

**NOTE:** Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences.

## 5.1 Weed Resistance Management

GROUP	9	HERBICIDE
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Glyphosate, the active ingredient in this product, is a Group 9 herbicide based on the mode of action classification system of the Weed Science Society of America. Any weed population may contain plants naturally resistant to Group 9 herbicides. Weed species resistant to Group 9 herbicides may be effectively managed utilizing another herbicide from a different Group or using other cultural or mechanical practices.

To minimize the occurrence of glyphosate-resistant biotypes observe the following general weed management recommendations:

- Scout your application site before and after herbicide applications.
- Control weeds early when they are relatively small.
- Incorporate other herbicides and cultural or mechanical practices as part of your weed control system where appropriate.
- Use the labeled rate for the most difficult weed in the site. Avoid tank mixtures with other herbicides that reduce this product's efficacy (through antagonism) or with tank mixtures that encourage rates of this product below those specified on this label.
- Control weed escapes and prevent weeds from setting seeds.
- Clean equipment before moving from site to site to minimize spread of weed seed.
- Use new commercial seed as free of weed seed as possible.
- Report any incidence of repeated non-performance of this product on a particular weed to your Monsanto representative, local retailer, or county extension agent.

## 5.2 Management Recommendations for Glyphosate-Resistant Weed Biotypes

**NOTE:** Appropriate testing is critical in order to confirm weed resistance to glyphosate. Contact your Monsanto representative to determine if resistance in any particular weed biotype in your area has been confirmed. Control recommendations for biotypes confirmed as resistant to glyphosate are made available on separately published supplemental

labeling or Fact Sheets for this product and may be obtained from your local retailer or Monsanto representative.

Since the occurrence of new glyphosate-resistant weeds cannot be determined until after product use and scientific confirmation, Monsanto Company is not responsible for any losses that may result from the failure of this product to control glyphosate-resistant weed biotypes.

The following good weed management practices are recommended to reduce the spread of confirmed glyphosate-resistant biotypes:

- If a naturally occurring resistant biotype is present at your site, this product may be tank mixed or applied sequentially with an appropriately labeled herbicide with a different mode of action to achieve control.
- Cultural and mechanical control practices may also be used as appropriate.
- Scout treated sites after herbicide applications and control weed escapes of resistant biotypes before they set seed.
- Thoroughly clean equipment before leaving sites known to contain resistant biotypes.

## 6.0 MIXING

Clean sprayer parts immediately after using this product by thoroughly flushing with water.

**NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, SUCH AS VISIBLY MUDDY WATER OR WATER FROM PONDS AND DITCHES THAT IS NOT CLEAR.**

### 6.1 Mixing with Water

This product mixes readily with water. Mix spray solutions of this product as follows: Fill the mixing or spray tank with the required amount of water. Add the labeled amount of this product near the end of the filling process and mix well. Use caution to avoid siphoning back into the carrier source. Use approved anti-back-siphoning devices where required by state or local regulations. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved anti-foam or defoaming agent.

### 6.2 Tank Mixtures

When this product is tank mixed with other products, refer to the tank-mix product labels for approved non-crop sites and application rates. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used. Use according to the most restrictive precautionary statements for each product in the mixture. Any labeled rate of this product may be used in a tank mix.

When this label lists a tank mixture with a generic active ingredient such as diuron, 2,4-D, or dicamba, the user is responsible for ensuring the mixture product label allows the specific application.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly listed in this label. Mixing this product with herbicides or other materials not specified on this label may result in reduced performance.

### 6.3 Tank Mixing Procedure

When tank mixing, read and carefully observe label directions, cautionary statements and all information on the labels of all products used. Add the tank-mix product to the tank as directed by the label. Maintain agitation and add the labeled amount of this product.

Maintain good agitation at all times until the contents of the tank are sprayed. If the spray mixture is allowed to settle, thorough agitation is required to resuspend the mixture before spraying is resumed.

Keep by-pass line on or near the bottom of the tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50-mesh.

Always predetermine the compatibility of labeled tank mixtures of this product with water carrier by mixing small proportional quantities in advance. Ensure that the specific tank mixture product is registered for application at the desired site.

Refer to the "Tank Mixtures" section for additional precautions.

### 6.4 Mixing Percent Solutions

Prepare the desired volume of spray solution by mixing the amount of this product in water as shown in the following table:

#### Spray Solution

Desired Volume	Amount of AquaMaster herbicide					
	0.5%	0.75%	1%	1.5%	4%	8%
1 gal	2/3 oz	1 oz	1.3 oz	2 oz	5 oz	10 oz
25 gal	1 pt	1.5 pt	1 qt	1.5 qt	4 qt	2 gal
100 gal	2 qt	3 qt	1 gal	1.5 gal	4 gal	8 gal

2 tablespoons = 1 fluid ounce

For use in backpack, knapsack or pump-up sprayers, it is suggested that the amount of this product be mixed with water in a larger container. Fill sprayer with the mixed solution.

## 6.5 Surfactant

This product requires the use of a nonionic surfactant unless otherwise specified. When using this product, unless otherwise specified, mix 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution. Increasing the rate of surfactant may enhance performance. Examples of when to use the higher surfactant rate include, but are not limited to: hard to control woody brush, trees and vines, high water volumes, adverse environmental conditions, tough to control weeds, weeds under stress, surfactants with less than 70 percent active ingredient, tank mixes, etc. These surfactants should not be used in excess of 1 quart per acre when making broadcast applications. Always read and follow the manufacturer's surfactant label for best results. Carefully observe all cautionary statements and other information appearing in the surfactant label.

## 6.6 Colorants or Dyes

Approved colorants or marking dyes may be added to this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilution. Use colorants or dyes according to the manufacturer's instructions.

## 6.7 Drift Reduction Additives

Drift reduction additives may be used with all equipment types, except wiper applicators, and sponge bars. When a drift reduction additive is used, read and carefully observe the precautionary statements and all other information appearing on the additive label. The use of drift reduction additives can affect spray coverage which may result in reduced performance.

# 7.0 APPLICATION EQUIPMENT AND TECHNIQUES

DO NOT APPLY THIS PRODUCT THROUGH ANY TYPE OF IRRIGATION SYSTEM.

APPLY THESE SPRAY SOLUTIONS IN PROPERLY MAINTAINED AND CALIBRATED EQUIPMENT CAPABLE OF DELIVERING DESIRED VOLUMES.

### SPRAY DRIFT MANAGEMENT

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determines the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

## 7.1 Aerial Equipment

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL.

FOR AERIAL APPLICATION IN CALIFORNIA, REFER TO THE FEDERAL SUPPLEMENTAL LABELING FOR AERIAL APPLICATIONS IN THAT STATE OR COUNTY FOR SPECIFIC INSTRUCTIONS, RESTRICTIONS AND REQUIREMENTS.

This product, when tank mixed with dicamba, may not be applied by air in California. Only 2,4-D amine formulations may be applied by air in California.

TO PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Avoid direct application to any body of water.

Use the labeled rates of this herbicide in 3 to 25 gallons of water per acre.

Ensure uniform application. To avoid streaked, uneven or overlapped application, use appropriate marking devices.

### AERIAL SPRAY DRIFT MANAGEMENT

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to public health uses.

1. The distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees. Where states have more stringent regulations, they should be observed.

### Importance of Droplet Size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see

the "Wind", "Temperature and Humidity", and "Temperature Inversions" sections of this label).

### Controlling Droplet Size

- **Volume:** Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with the higher rated flows produce larger droplets.
- **Pressure:** Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of nozzles:** Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle orientation:** Orienting nozzles so that the spray is released backwards, parallel to the air stream, will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- **Nozzle type:** Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce larger droplets than other nozzle types.
- **Boom length:** For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.
- **Application height:** Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces the exposure of the droplets to evaporation and wind.

### Swath Adjustment

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller droplets, etc.).

### Wind

Drift potential is lowest between wind speeds of 2 to 10 miles per hour. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 miles per hour due to variable wind direction and high inversion potential. **NOTE:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift.

### Temperature and Humidity

Set up equipment to produce larger droplets when making applications in low relative humidity to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

### Temperature Inversions

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

### Sensitive Areas

This product should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

### Aircraft Maintenance

PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion. To prevent corrosion of exposed parts, thoroughly wash aircraft after each day of spraying to remove residues of this product accumulated during spraying or from spills. Landing gear is most susceptible.

## 7.2 Ground Broadcast Equipment

For broadcast ground applications, unless otherwise specified in this label or in separate supplemental labeling or Fact Sheets published by Monsanto, use this product at the rate of 1.5 to 3 pints per acre for annual weeds, 3 to 7.5 pints per acre for perennial weeds and 3 to 7.5 pints per acre for woody brush and trees. When used according to label directions this product will give control or partial control of herbaceous weeds, woody brush and trees listed in the "WEEDS CONTROLLED" section of this label.

Use the labeled rates of this product in 3 to 40 gallons of water per acre as a broadcast spray unless otherwise specified. As density of weeds increases, spray volume should be increased within the labeled range to ensure complete coverage. Carefully select proper nozzles to avoid spraying a fine mist. For best results with ground application equipment, use flat-fan nozzles. Check spray pattern for even distribution of spray droplets.

## 7.3 Hand-Held Equipment

Apply to foliage of vegetation to be controlled. For applications made on a spray-to-wet basis, spray coverage should be uniform and complete. Do not spray to the point of runoff. Use coarse sprays only.

For control of weeds listed in the "Annual Weeds" section of "WEEDS CONTROLLED", apply a 0.5-percent solution of this product to weeds less than 6 inches in height or runner length. For annual weeds over 6 inches tall, or unless otherwise specified, use a 1-percent solution. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds.

For best results, use a 1.5-percent solution on harder-to-control perennials, woody vines, brush and trees. Make applications to perennials after seedhead emergence in grasses or bud formation in broadleaf weeds, woody brush and trees for best results.

For low-volume directed spray applications, use a 4- to 8-percent solution of this product for control or partial control of annual weeds, perennial weeds, or woody brush and trees. Spray coverage should be uniform with at least 50 to 75 percent of the foliage contacted. Coverage of the top one half of the plant is important for best results. If a straight stream nozzle is used, start the application at the top of the targeted vegetation and spray from top to bottom in a lateral zigzag motion. For flat-fan and cone nozzles and with hand-directed mist blowers, mist the application over the foliage of the targeted vegetation. To ensure adequate spray coverage, spray both sides of large or tall woody brush and trees, when foliage is thick and dense, or where there are multiple sprouts. For best results, apply to actively growing woody brush and trees after full leaf expansion and before fall color and leaf drop.

Unless otherwise specified, use the rates listed in the following "Application Rates" table for various methods of foliar application using high-volume, backpack, knapsack and similar types of hand-held equipment. When used according to label directions this product will give control or partial control of herbaceous weeds, woody brush and trees listed in the "WEEDS CONTROLLED" section of this label.

### Application Rates

APPLICATION	AQUAMASTER HERBICIDE	SPRAY VOLUME GALLONS/ACRE
<b>SPRAY-TO-WET</b>		
Handgun or Backpack	0.5 to 1.5% by volume	spray-to-wet*
<b>LOW-VOLUME DIRECTED SPRAY</b>		
Backpack	4 to 8% by volume	15 to 25**
Modified High-Volume	1.5 to 3% by volume	40 to 60**

\*For applications made on a spray-to-wet basis, spray coverage should be uniform and complete. Do not spray to the point of runoff.

\*\*Low-volume directed applications with backpacks work best when treating weeds and brush less than 10 feet tall. For taller weeds and brush, high-volume handguns can be modified by reducing nozzle size and spray pressure to produce a low-volume directed spray.

## 7.4 Selective Equipment

This product may be applied through shielded applicators, hooded sprayers, wiper applicators or sponge bars, after dilution and thorough mixing with water, to listed weeds growing in any aquatic or non-crop site specified on this label.

**AVOID CONTACT OF HERBICIDE WITH DESIRABLE VEGETATION, AS SERIOUS INJURY OR DEATH IS LIKELY TO OCCUR.**

Applicators used above desired vegetation should be adjusted so that the lowest spray stream or wiper contact point is at least 2 inches above the desirable vegetation. Droplets, mist, foam or splatter of the herbicide solution settling on desirable vegetation is likely to result in discoloration, stunting or destruction.

Better results may be obtained when more of the weed is exposed to the herbicide solution. Weeds not contacted by the herbicide solution will not be affected. This may occur in dense clumps, severe infestations or when the height of the weeds varies so that not all weeds are contacted. In these instances, repeat treatment may be necessary.

### Shielded and Hooded Applicators

A shielded or hooded applicator directs the herbicide solution onto weeds, while shielding desirable vegetation from the herbicide. Use nozzles that provide uniform coverage within the treated area. Keep shields on these sprayers adjusted to protect desirable vegetation. EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF HERBICIDE WITH DESIRABLE VEGETATION.

### Wiper Applicators and Sponge Bars

Wiper applicators are devices that physically wipe appropriate amounts of this product directly onto the weed.

Equipment must be designed, maintained and operated to prevent the herbicide solution from contacting desirable vegetation. Operate this equipment at ground speeds no greater than 5 miles per hour. Performance may be improved by reducing speed in areas of heavy weed infestations to ensure adequate wiper saturation. Better results may be obtained if 2 applications are made in opposite directions.

Avoid leakage or dripping onto desirable vegetation. Adjust height of applicator to ensure adequate contact with weeds. Keep wiping surfaces clean. Be aware that, on sloping ground, the herbicide solution may migrate, causing dripping on the lower end and drying of the wicks on the upper end of a wiper applicator.

Do not use wiper equipment when weeds are wet.

Mix only the amount of solution to be used during a 1-day period, as reduced activity may result from the use of leftover solutions. Clean wiper parts immediately after using this product by thoroughly flushing with water.

Nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended with all wiper applications.

**For Rope or Sponge Wick Applicators**—Solutions ranging from 33 to 75 percent of this product in water may be used.

**For Panel Applicators**—Solutions ranging from 33 to 100 percent of this product in water may be used in panel wiper applicators.

## 8.0 SITE AND USE INSTRUCTIONS

Unless otherwise specified, applications may be made to control any weeds listed in the "Annual Weeds", "Perennial Weeds" and "Woody Brush and Trees" rate tables. Refer also to the "Selective Equipment" section.

### 8.1 Aquatic Sites

This product may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas.

This product may also be used to control the labeled weeds, woody brush and trees growing in other terrestrial non-crop sites listed on this label or in aquatic sites within these areas.

If aquatic sites are present in a non-crop area and are part of the intended treatment, read and observe the following directions:

**This product does not control plants which are completely submerged or have a majority of their foliage under water.**

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.

**NOTE:** Do not apply this product directly to water within 0.5 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 0.5 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 0.5 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made ONLY in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. This restriction does NOT apply to intermittent inadvertent overspray of water in terrestrial use sites.

For treatments after drawdown of water or in dry ditches, allow 7 or more days after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after drawdown to ensure application to actively growing weeds.

Floating mats of vegetation may require retreatment. Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not retreat within 24 hours following the initial treatment.

Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7.5 pints per acre must not be exceeded in any single broadcast application that is being made over water except as follows, where any labeled rate may be applied:

- Stream crossings in utility rights-of-way.
- Where applications will result in less than 20 percent of the total water area being treated.

When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

### Tank Mixtures

Tank mixtures of this product plus 2,4-D amine may be used to increase the spectrum of vegetation controlled in aquatic sites. Use 1.5 to 2 pints of this product plus 1 to 2 quarts of 2,4-D amine (4 pounds active ingredient per gallon, labeled for aquatic sites) for control of annual weeds. Use 3 to 7.5 pints of this product plus 2 to 4 quarts of 2,4-D amine (4 pounds active ingredient per gallon, labeled for aquatic sites) for control or partial control of perennial weeds, woody brush and trees.

When tank mixing, read and carefully observe the label claims, cautionary statements and all information on the labels of all products used. Use according to the most restrictive precautionary statements for each product in the mixture. Mix in the following sequence: Fill sprayer tank one-half full with water, add AquaMaster herbicide, then 2,4-D amine and finally surfactant. Fill sprayer tank to final volume of water.

**NOTE: DO NOT MIX AQUAMASTER HERBICIDE AND 2,4-D AMINE CONCENTRATES WITHOUT WATER CARRIER. DO NOT MIX AQUAMASTER HERBICIDE AND 2,4-D AMINE IN BYPASS INJECTOR-TYPE SPRAY EQUIPMENT.**

#### For Control of Cordgrass (*Spartina spp.*)

The presence of debris and silt on the surface of cordgrass plants will reduce product performance. It may be necessary to wash targeted plants prior to application to improve herbicide uptake. Where cordgrass has been cut or mowed prior to application, allow significant regrowth before application to ensure adequate interception and uptake of the herbicide solution. Rainfall within 2 hours or immersion within 4 hours after application may reduce effectiveness.

Prior to application, survey the areas to be treated to determine if shellfish beds exist within the intended treatment area. Wait either until shellfish have been harvested before application is made or do not harvest shellfish for 14 days following treatment.

Add 1 to 2 quarts or more of nonionic surfactant or other adjuvant approved for use on aquatic sites and compatible with this product per 100 gallons of spray solution for broadcast applications (ground or air) and when using optical sensing application equipment.

Do not apply this product through any type of irrigation system.

**APPLICATION:** Under ideal application conditions, that is, where silt and debris are not present on plant surfaces, good spray coverage is achievable, target plants are actively growing and labeled rates and application volumes are used, allow at least 4 hours drying time before plants are covered by tidewater. Where one or more of these conditions are not met, schedule applications to allow at least 5 hours drying time before plants are covered by tidewater. Do not apply when wind speed at the application site exceed 10 miles per hour.

**Broadcast Application (Ground):** Apply 2 to 8 quarts of this herbicide in 5 to 100 gallons of spray solution per acre. For best results, complete coverage of cordgrass clumps is required.

**Broadcast Application (Ground/Optical Sensing Application Equipment):** Apply 2 to 8 quarts of this product in 5 to 100 gallons of spray solution per acre using equipment designed and calibrated to deliver spray solution only when cordgrass plants are present and detected by optical sensors. For best results, complete coverage of cordgrass clumps is required.

**Hand-Held Backpack or High-Volume Equipment:** Apply a 5 to 8 percent solution of this product. Ensure that complete coverage of cordgrass clumps is achieved. Do not spray to the point of runoff.

**Broadcast Application (Air):** Apply 2 to 8 quarts of this product in 5 to 10 gallons of spray solution per acre. Maintain at least a 50-foot buffer between commercial shellfish beds and treated areas. The potential for spray drift is dependent upon weather- and equipment-related factors. The applicator must be familiar with local wind patterns and monitor and record temperature and wind speed prior to and periodically during application. Schedule application in order to allow at least 5 hours before treated plants are covered by tidewater.

#### For Control of Giant Salvinia

For control of Giant Salvinia, this product may be applied as a 2.0% v/v spray-to-wet solution with 0.5 to 2.0% v/v of a nonionic surfactant containing at least 70 percent active ingredient. Ensure thorough coverage when using spray-to-wet treatments using hand-held equipment.

For broadcast applications, apply 3 to 3.75 quarts of this product with an aquatic approved surfactant system containing 0.1% v/v nonionic organosilicone and 0.25% v/v nonionic spreader sticker surfactant in 3 to 40 gallons per acre as a broadcast treatment.

Allow at least 3 days after application before disturbing treated vegetation. This product does not control plants which are completely submerged or have a majority of their foliage under water.

## 8.2 Hollow Stem Injection

This product may be applied through hand-held injection devices that deliver labeled amounts of this product into targeted hollow stem plants growing in any aquatic or non-crop site specified on this label. For control of the following hollow stem plants, follow the use instructions below:

#### Castorbean (*Ricinus communis*)

Inject 4 mL/plant of this product into the lower portion of the main stem.

#### Hemlock, Poison (*Conium maculatum*)

Inject one leaf cane per plant 10 to 12 inches above root crown with 5 mL of a 5% v/v solution of this product.

#### Hogweed, Giant (*Heracleum mantegazzianum*)

Inject one leaf cane per plant 12 inches above root crown with 5 mL of a 5% v/v solution of this product.

#### Horsetail, Field (*Equisetum arvense*)

Inject one segment above the root crown with 0.5 mL/stem of this product. Use a small syringe that calibrates to this rate.

#### Iris, Yellow Flag (*Iris pseudocorus*)

Cut flower stems with clippers 8 to 9 inches above the root crown. Use a cavity needle that is pushed into the stem center and then slowly removed as 0.5 mL/stem of this product is injected into the stem.

#### Knotweed, Bohemian (*Polygonum bohemicum*)

#### Knotweed, Giant (*Polygonum sachalinense*)

#### Knotweed, Japanese (*Polygonum cuspidatum*)

Inject 5 mL/stem of this product between second and third internode.

#### Reed, Giant (*Arundo donax*)

Inject 6 mL/stem of this product between second and third internode.

#### Thistle, Canada (*Cirsium arvense*)

Cut 8 to 9 of the tallest plants at bud stage in a clump with clippers. Use a cavity needle that is pushed into the stem center and then slowly removed as 0.5 mL/stem of this product is injected into the stem.

**NOTE:** Based on the maximum annual use rate of glyphosate for these non-crop sites, the combined total for all treatments must not exceed 8 quarts of this product per acre. At 5 mL per stem, 8 quarts should treat approximately 1500 stems.

## 8.3 Cut Stump

Cut stump treatments may be made on any site listed on this label. This product will control many types of woody brush and tree species. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut trees or resprouts close to the soil surface. Apply a 50- to 100-percent solution of this product to the freshly-cut surface **immediately after cutting**. Delays in application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

For control of *Ailanthus altissima* (Tree-of-heaven) make a cut stump treatment according to the directions in this section using a spray mixture of 50 percent AquaMaster herbicide and 10 percent Arsenal.

**DO NOT MAKE CUT STUMP APPLICATIONS WHEN THE ROOTS OF DESIRABLE WOODY BRUSH OR TREES MAY BE GRAFTED TO THE ROOTS OF THE CUT STUMP.** Some sprouts, stems, or trees may share the same root system. Adjacent trees having a similar age, height and spacing may signal shared roots. Whether grafted or shared, injury is likely to occur to non-treated stems/trees when one or more trees sharing common roots are treated.

## 8.4 General Non-crop Areas and Industrial Sites

Use in areas such as airports, apartment complexes, commercial sites, ditch banks, driveways, dry ditches, dry canals, fencerows, forestry sites, golf courses, greenhouses, industrial sites, lumber yards, manufacturing sites, municipal sites, natural areas, office complexes, ornamentals, parks, parking areas, pastures, petroleum tank farms and pumping installations, railroads, rangeland, recreational areas, residential areas, rights-of-way, roadsides, schools, sod or turf seed farms, sports complexes, storage areas, substations, utility sites, warehouse areas, and wildlife management areas.

#### General Weed Control, Trim-and-Edge and Bare Ground

This product may be used in general non-crop areas. It may be applied with any application equipment described in this label. This product may be used to trim-and-edge around objects in non-crop sites, for spot treatment of unwanted vegetation and to eliminate unwanted weeds growing in established shrub beds or ornamental plantings. This product may be used prior to planting an area to ornamentals, flowers, turfgrass (sod or seed), or prior to laying asphalt or beginning construction projects.

Repeated applications of this product may be used, as weeds emerge, to maintain bare ground.

**TANK MIXTURES:** This product may be tank mixed with the following products. Refer to these product labels for approved non-crop sites and application rates. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used. Use according to the most restrictive precautionary statements for each product in the mixture.

Arsenal	Outrider®
Barricade 65WG	Pendulum 3.3 EC
Certainty®	Pendulum WDG
diuron*	Plateau
Endurance	Princept DF
Escort XP	Princept Liquid
Garlon 3A	Ronstar 50 WP
Garlon 4	Sahara
Hyvar X	simazine*
Karmex	Surflan
Krovar I DF	Telar
Oust XP	2,4-D*

\*User is responsible for ensuring that tank mixtures with products containing this generic active ingredient may be made provided the specific product is registered for this use.

This product plus dicamba tank mixtures may not be applied by air in California.

### **Brush Control Tank Mixtures**

**TANK MIXTURES:** Tank mixtures of this product may be used to increase the spectrum of control for herbaceous weeds, woody brush and trees. When tank mixing, read and carefully observe the label claims, cautionary statements and all information on the labels of all products used. Use according to the most restrictive precautionary statements for each product in the mixture. Any labeled rate of this product may be used in a tank mix.

For control of herbaceous weeds, use the lower tank mixture rates. For control of dense stands or tough-to-control woody brush and trees, use the higher rates.

**NOTE:** For side trimming treatments, this product may be used alone or in tank mixture with Garlon 4.

PRODUCT
Arsenal
Escort XP
Garlon 3A*
Garlon 4

\* Ensure that Garlon 3A is thoroughly mixed with water according to label directions before adding this product. Have spray mixture agitating at the time this product is added to avoid spray compatibility problems.

## **8.5 Habitat Management**

### **Habitat Restoration and Management**

This product may be used to control exotic and other undesirable vegetation in habitat management and natural areas, including riparian and estuarine areas, rangeland and wildlife refuges. Applications can be made to allow recovery of native plant species, prior to planting desirable native species, and for similar broad-spectrum vegetation control requirements. Spot treatments can be made to selectively remove unwanted plants for habitat management and enhancement.

### **Wildlife Food Plots**

This product may be used as a site preparation treatment prior to planting wildlife food plots. Any wildlife food species may be planted after applying this product, or native species may be allowed to repopulate the area. If tillage is needed to prepare a seedbed, wait 7 days after application before tillage to allow translocation into underground plant parts.

## **8.6 Injection and Frill (Woody Brush and Trees)**

This product may be used to control woody brush and trees by injection or frill applications. Apply this product using suitable equipment that must penetrate into the living tissue. Apply 1 mL of this product per each 2 to 3 inches of trunk diameter at breast height (DBH). This is best achieved by applying a 50- to 100-percent concentration of this product either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frilled or cut areas in species that exude sap freely. In species such as this, make the frill or cuts at an oblique angle to produce a cupping effect and use a 100-percent concentration of this product. For best results, application should be made during periods of active growth and after full leaf expansion.

## **8.7 Roadsides**

All of the instructions in the "General Non-Crop Areas and Industrial Sites" section apply to roadsides.

### **Shoulder Treatments**

This product may be used on road shoulders. It may be applied with boom sprayers, shielded boom sprayers, high-volume off-center nozzles, hand-held equipment, and similar equipment.

### **Guardrails and Other Obstacles to Mowing**

This product may be used to control weeds growing under guardrails and around signposts and other objects along the roadside.

### **Spot Treatment**

This product may be used as a spot treatment to control unwanted vegetation growing along roadsides.

**TANK MIXTURES:** This product may be tank mixed with the following products for shoulder, guardrail, spot and bare ground treatments, provided that the specific tank mixture product is registered for use on such sites. Refer to these product labels for approved non-crop sites and application rates. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used. Use according to the most restrictive precautionary statements for each product in the mixture.

atrazine*	Landmark MP	Sahara DG
Crossbow L	Landmark XP	simazine*
dicamba*	Oust XP	Surflan AS
diuron*	Outrider	Surflan WDG
Endurance	pendimethalin*	Telar DF
Escort XP	Plateau	Velpar DF
Gallery 75 DF	Plateau DG	Velpar L
Krovar I DF	Poast	2,4-D*
Landmark II MP	Ronstar 50 WSP	

\*User is responsible for ensuring that tank mixtures with products containing this generic active ingredient may be made provided the specific product is registered for this use.

See the "MIXING" section of this label for general instructions for tank mixing.

### **Release of Bermudagrass or Bahiagrass**

#### **Dormant Applications**

This product may be used to control or partially control many winter annual weeds and tall fescue for effective release of dormant bermudagrass or bahiagrass. Treat only when turf is dormant and prior to spring greenup. This product may also be tank mixed with Outrider herbicide or Oust XP for residual control. Tank mixtures of this product with Oust XP may delay greenup.

For best results on winter annuals, treat when plants are in an early growth stage (below 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is at or beyond the 4- to 6-leaf stage.

Apply 6 to 48 ounces of this product in a tank mixture with 0.75 to 1.33 ounces Outrider herbicide per acre. Read and follow all label directions for Outrider herbicide.

**TANK MIXTURES:** Apply 6 to 48 fluid ounces of this product per acre alone or in a tank mixture with 0.25 to 1 ounce per acre of Oust XP. Apply the labeled rates in 10 to 40 gallons of water per acre. Use only in areas where bermudagrass or bahiagrass are desirable ground covers and where some temporary injury or discoloration can be tolerated. To avoid delays in greenup and minimize injury, add no more than 1 ounce of Oust XP per acre on bermudagrass and no more than 0.5 ounce of Oust XP per acre on bahiagrass and avoid treatments when these grasses are in a semi-dormant condition.

#### **Actively Growing Bermudagrass**

This product may be used to control or partially control many annual and perennial weeds for effective release of actively growing bermudagrass. Apply 12 to 36 fluid ounces of this product in 10 to 40 gallons of spray solution per acre. Use the lower rate when treating annual weeds below 6 inches in height (or runner length). Use the higher rate as weeds increase in size or as they approach flower or seedhead formation. These rates will also provide partial control of the following perennial species:

Bahiagrass	Johnsongrass
Bluestem, silver	Trumpet creeper
Fescue, tall	Vaseygrass

This product may be tank mixed with Outrider herbicide for control or partial control of Johnsongrass and other weeds listed in the Outrider herbicide label. Use 6 to 24 ounces of this product with 0.75 to 1.33 ounces of Outrider herbicide. Use the higher rates of both products for control of perennial weeds or annual weeds greater than 6 inches in height.

**TANK MIXTURES:** This product may be tank mixed with Oust XP. If tank mixed, use no more than 12 to 24 fluid ounces of this product with 1 to 2 ounces of Oust XP per acre. Use the lower rates of each product to control annual weeds less than 6 inches in height (or runner length) that are listed in this label and the Oust XP label. Use the higher rates as annual weeds increase in size and approach the flower or seedhead stages. These rates will also provide partial control of the following perennial weeds:

Bahiagrass	Fescue, tall
Bluestem, silver	Johnsongrass
Broomsedge	Poorjoe
Dallisgrass	Trumpet creeper
Dock, curly	Vaseygrass
Dogfennel	Vervain, blue

Use only on well-established bermudagrass. Bermudagrass injury may result from the treatment, but regrowth will occur under moist conditions. Repeat applications of the tank mix in the same season are not recommended, since severe injury may occur.

#### **Actively Growing Bahiagrass**

For suppression of vegetative growth and seedhead inhibition of bahiagrass for approximately 45 days, apply 4 fluid ounces of this product in 10 to 40 gallons of water per acre. Apply 1 to 2 weeks after full greenup or after mowing to a uniform height of 3 to 4 inches. This application must be made prior to seedhead emergence.

For suppression up to 120 days, apply 3 fluid ounces of this product per acre, followed by an application of 2 to 3 fluid ounces per acre about 45 days later. Make no more than 2 applications per year.

This product may be used for control or partial control of Johnsongrass and other weeds listed on the Outrider herbicide label in actively growing bahiagrass. Apply 1.5 to 3.5 fluid ounces of this product with 0.75 to 1.33 ounces of Outrider herbicide per acre. Use the higher rates for control of perennial weeds or annual weeds greater than 6 inches in height. Use only on well-established bahiagrass.

**TANK MIXTURES:** A tank mixture of this product plus Oust XP may be used. Apply 4 fluid ounces of this product plus 0.25 ounce of Oust XP per acre 1 to 2 weeks following an initial spring mowing. Make only one application per year.

## 9.0 WEEDS CONTROLLED

Always use the higher rate of this product per acre within the labeled range when weed growth is heavy or dense or weeds are growing in an undisturbed (non-cultivated) area. Reduced results may occur when treating weeds heavily covered with dust. For weeds that have been mowed, grazed or cut, allow regrowth to occur prior to treatment.

Refer to the following label sections for application rates for the control of annual and perennial weeds and woody brush and trees. For difficult to control perennial weeds and woody brush and trees, where plants are growing under stressed conditions, or where infestations are dense, this product may be used at 4.5 to 8 quarts per acre for enhanced results.

### 9.1 Annual Weeds

Apply to actively growing annual grasses and broadleaf weeds.

Allow at least 3 days after application before disturbing treated vegetation. After this period the weeds may be mowed, tilled or burned. See the "GENERAL INFORMATION" and "MIXING" and "APPLICATION EQUIPMENT AND TECHNIQUES" sections for labeled uses and specific application instructions.

Use 1.5 pints per acre if weeds are less than 6 inches in height or runner length and 1 to 4 quarts per acre if weeds are over 6 inches in height or runner length or when weeds are growing under stressed conditions.

For spray-to-wet applications, apply a 0.5-percent solution of this product to weeds less than 6 inches in height or runner length. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds. For annual weeds over 6 inches tall, or for smaller weeds growing under stressed conditions, use a 0.75- to 1.5-percent solution. Use the higher rate for tough-to-control species or for weeds over 24 inches tall.

#### WEED SPECIES

Anoda, spurred	Lamb's-quarters*
Balsamapple**	Lettuce, prickly*
Barley*	Mannagrass, eastern*
Barley, little*	Mayweed
Barnyardgrass*	Medusahead*
Bassia, fivehook	Morningglory ( <i>Pomoea spp.</i> )
Bittercress*	Mustard, blue*
Bluegrass, annual*	Mustard, tansy*
Bluegrass, bulbous*	Mustard, tumble*
Brome, downy*	Mustard, wild*
Brome, Japanese*	Nightshade, black*
Broomsedge	Oats
Buttercup*	Panicum, browntop*
Castorbean	Panicum, fall*
Cheatgrass*	Panicum, Texas*
Cheeseweed ( <i>Malva parviflora</i> )	Pennycress, field*
Chervil*	Pepperweed, Virginia*
Chickweed*	Pigweed*
Cocklebur*	Puncturevine
Copperleaf, hophornbeam	Purslane, common
Copperleaf, Virginia	Pusley, Florida
Coreopsis, plains/tickseed*	Ragweed, common*
Corn*	Ragweed, giant
Crabgrass*	Rice, red
Cupgrass, woolly*	Rocket, London*
Dwarfandelion*	Rocket, yellow
Eclipta*	Rye*
Falsedandelion*	Ryegrass*
Falseflax, smallseed*	Sandbur, field*
Fiddleneck	Sesbania, hemp
Filaree	Shattercane*
Fleabane, annual*	Shepherd's-purse*
Fleabane, hairy ( <i>Conyza bonariensis</i> )*	Sicklepod
Fleabane, rough*	Signalgrass, broadleaf*
Foxtail*	Smartweed, ladysthumb*
Foxtail, Carolina*	Smartweed, Pennsylvania*
Geranium, Carolina	Sorghum, grain (milo)*
Goatgrass, jointed*	Sowthistle, annual
Goosegrass	Spanishneedles***
Groundsel, common*	Speedwell, corn*
Henbit	Speedwell, purslane*
Horseweed/Marestail ( <i>Conyza canadensis</i> )	Sprangletop*
Itchgrass*	Spurge, annual
Johnsongrass, seedling	Spurge, prostrate*
Junglerice	Spurge, spotted*
Knotweed	Spurry, umbrella*
Kochia	Starthistle, yellow
	Stinkgrass*
	Sunflower*
	Teaweed/prickly sida

Thistle, Russian

Velvetleaf

Wheat\*

Wild oats\*

Witchgrass

\*When using field broadcast equipment (aerial applications or boom sprayers using flat-fan nozzles) these species will be controlled or partially controlled using 12 fluid ounces of this product per acre. Applications must be made using 3 to 10 gallons of carrier volume per acre. Use nozzles that ensure thorough coverage of foliage and treat when weeds are in an early growth stage.

\*\*Apply with hand-held equipment only.

\*\*\*Apply 3 pints of this product per acre.

### 9.2 Perennial Weeds

Best results are obtained when perennial weeds are treated after they reach the reproductive stage of growth (seedhead initiation in grasses and bud formation in broadleaves). For non-flowering plants, best results are obtained when the plants reach a mature stage of growth. In many situations, treatments are required prior to these growth stages. Under these conditions, use the higher application rate within the labeled range.

Ensure thorough coverage when using spray-to-wet treatments using hand-held equipment. When using hand-held equipment for low-volume directed spot treatments, apply a 4- to 8-percent solution of this product.

Allow 7 or more days after application before tillage. If weeds have been mowed or tilled, do not treat until regrowth has reached the specified stages. Fall treatments must be applied before a killing frost.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed.

WEED SPECIES	RATE (QT/A)	HAND-HELD % SOLUTION
Alfalfa*	0.7	1.5
Alligatorweed*	3.0	1.3
Anise (fennel)	1.5 - 3.0	1.0 - 1.5
Bahiagrass	2.3 - 3.75	1.5
Beachgrass, European ( <i>Ammophila arenaria</i> )	-	3.5
Bentgrass*	1.0	1.5
Bermudagrass	4.0	1.5
Bermudagrass, water (knotgrass)	1.0	1.5
Bindweed, field	3.0 - 3.75	1.5
Bluegrass, Kentucky	1.5 - 2.3	0.75
Blueweed, Texas	3.0 - 3.75	1.5
Brackenfern	2.3 - 3.0	0.75 - 1.0
Bromegrass, smooth	1.5 - 2.3	0.75
Bursage, woolly-leaf	-	1.5
Canarygrass, reed	1.5 - 2.3	0.75
Cattail	2.3 - 3.75	0.75
Clover; red, white	2.3 - 3.75	1.5
Cogongrass	2.3 - 3.75	1.5
Cordgrass	2.3 - 3.75	1.0 - 2.0
Cutgrass, giant	3.0	1.0
Dallisgrass	2.3 - 3.75	1.5
Dandelion	2.3 - 3.75	1.5
Dock, curly	2.3 - 3.75	1.5
Dogbane, hemp	3.0	1.5
Fescue (except tall)	2.3 - 3.75	1.5
Fescue, tall	2.3	1.0
Guineagrass	2.3	0.75
Hemlock, poison	1.5 - 3.0	0.75 - 1.5
Horsenettle	2.3 - 3.75	1.5
Horseradish	3.0	1.5
Iceland	1.5	1.5
Ivy; German, cape	1.5 - 3.0	0.75 - 1.5
Jerusalem artichoke	2.3 - 3.75	1.5
Johnsongrass	1.5 - 2.3	0.75
Kikuyugrass	1.5 - 2.3	0.75
Knapweed	3.0	1.5
Lantana	-	0.75 - 1.0
Lespedeza	2.3 - 3.75	1.5
Loosestrife, purple	2.0	1.0 - 1.5
Lotus, American	2.0	0.75
Maidencane	3.0	0.75
Milkweed, common	2.3	1.5
Muhly, wirestem	1.5 - 2.3	0.75
Mullein, common	2.3 - 3.75	1.5
Napiergrass	2.3 - 3.75	1.5
Nightshade, silverleaf	3.0 - 3.75	1.5
Nutsedge; purple, yellow	2.3	0.75
Orchardgrass	1.5 - 2.3	0.75
Pampasgrass	2.3 - 3.75	1.5

WEED SPECIES	RATE (QT/A)	HAND-HELD % SOLUTION
Paragrass	3.0	0.75
Pepperweed, perennial	3.0	1.5
Phragmites*	2.0 - 3.75	0.75 - 1.5
Quackgrass	1.5 - 2.3	0.75
Redvine*	1.5	1.5
Reed, giant ( <i>Arundo donax</i> )	3.0 - 3.75	1.5
Ryegrass, perennial	1.5 - 2.3	0.75
Salvinia, giant	3.0 - 3.75	2.0
Smartweed, swamp	2.3 - 3.75	1.5
Spatterdock	3.0	0.75
Spurge, leafy*	-	1.5
Starthistle, yellow	-	1.5
Sweet potato, wild*	-	1.5
Thistle, artichoke	1.5 - 2.3	2.0
Thistle, Canada	1.5 - 2.3	1.5
Timothy	1.5 - 2.3	1.5
Torpedograss*	3.0 - 3.75	0.75 - 1.5
Trumpetcreeper*	1.5 - 2.3	1.5
Tules, common	-	1.5
Vaseygrass	2.3 - 3.75	1.5
Velvetgrass	2.3 - 3.75	1.5
Waterhyacinth	2.5 - 3.0	0.75 - 1.0
Waterlettuce	-	0.75 - 1.0
Waterprimrose	-	0.75
Wheatgrass, western	1.5 - 2.3	0.75

\*Partial control

**Alligatorweed**—Apply 3 quarts of this product per acre as a broadcast spray or as a 1.3-percent solution with hand-held equipment to provide partial control of alligatorweed. Apply when most of the target plants are in bloom. Repeat applications will be required to maintain such control.

**Beachgrass, European**—Apply an 8-percent solution of this products plus 0.5- to 1.5-percent nonionic surfactant on a low-volume spray-to-wet basis. Best results are obtained when applications are made when European beachgrass is actively growing through the boot to the full heading stages of growth. Make applications prior to the loss of more than 50 percent green leaf color in the fall. Do not treat when weeds are under drought stress. Repeat applications may be necessary.

**Bermudagrass**—Apply 4 quarts of this product per acre as a broadcast spray or as a 1.5-percent solution with hand-held equipment. Apply when target plants are actively growing and when seed heads appear.

**Bindweed, field / Silverleaf Nightshade / Texas Blueweed**—Apply 3 to 3.75 quarts of this product per acre as a broadcast spray west of the Mississippi River and 2.3 to 3 quarts of this product per acre east of the Mississippi River. With hand-held equipment, use a 1.5-percent solution. Apply when target plants are actively growing and are at or beyond full bloom. For silverleaf nightshade, best results can be obtained when application is made after berries are formed. Do not treat when weeds are under drought stress. New leaf development indicates active growth. For best results apply in late summer or fall.

**Brackenfern**—Apply 2.3 to 3 quarts of this product per acre as a broadcast spray or as a 0.75- to 1-percent solution with hand-held equipment. Apply to fully expanded fronds which are at least 18 inches long.

**Cattail**—Apply 2.3 to 3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Apply when target plants are actively growing and are at or beyond the early-to-full bloom stage of growth. Best results are achieved when application is made during the summer or fall months.

**Cogongrass**—Apply 2.3 to 3.75 quarts of this product per acre as a broadcast spray. Apply when cogongrass is at least 18 inches tall and actively growing in late summer or fall. Allow 7 or more days after application before tillage or mowing. Due to uneven stages of growth and the dense nature of vegetation preventing good spray coverage, repeat treatments may be necessary to maintain control.

**Cordgrass**—Apply 2.3 to 3.75 quarts of this product per acre as a broadcast spray or as a 1- to 2-percent solution with hand-held equipment. Schedule applications in order to allow 6 hours before treated plants are covered by tidewater. The presence of debris and silt on the cordgrass plants will reduce performance. It may be necessary to wash targeted plants prior to application to improve uptake of this product into the plant.

**Cutgrass, giant**—Apply 3 quarts of this product per acre as a broadcast spray or as a 1-percent solution with hand-held equipment to provide partial control of giant cutgrass. Repeat applications will be required to maintain such control, especially where vegetation is partially submerged in water. Allow for substantial regrowth to the 7- to 10-leaf stage prior to retreatment.

**Dogbane, hemp / Knapweed / Horseradish**—Apply 3 quarts of this product per acre as a broadcast spray or as a 1.5-percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth. For best results, apply in late summer or fall.

**Fescue, tall**—Apply 2.3 quarts of this product per acre as a broadcast spray or as a 1-percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained.

**Guineagrass**—Apply 2.3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Apply when target plants are actively growing and when most have reached at least the 7-leaf stage of growth.

**Johnsongrass / Bluegrass, Kentucky / Bromegrass, smooth / Canarygrass, reed / Orchardgrass / Ryegrass, perennial / Timothy / Wheatgrass, western**—Apply 1.5 to 2.3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained. In the fall, apply before plants have turned brown.

**Lantana**—Apply this product as a 0.75- to 1-percent solution with hand-held equipment. Apply to actively growing lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth.

**Loosestrife, purple**—Apply 2 quarts of this product per acre as a broadcast spray or as a 1- to 1.5-percent solution using hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost.

**Lotus, American**—Apply 2 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost. Repeat treatment may be necessary to control regrowth from underground parts and seeds.

**Maidencane / Paragrass**—Apply 3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Repeat treatments will be required, especially to vegetation partially submerged in water. Under these conditions, allow for regrowth to the 7- to 10-leaf stage prior to retreatment.

**Milkweed, common**—Apply 2.3 quarts of this product per acre as a broadcast spray or as a 1.5-percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth.

**Nutsedge: purple, yellow**—Apply 2.3 quarts of this product per acre as a broadcast spray, or as a 0.75-percent solution with hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Apply when target plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control.

**Pampasgrass**—Apply a 1.5-percent solution of this product with hand-held equipment when plants are actively growing.

**Phragmites**—For partial control of phragmites in Florida and the counties of other states bordering the Gulf of Mexico, apply 3.75 quarts per acre as a broadcast spray or apply a 1.5-percent solution with hand-held equipment. In other areas of the U.S., apply 2 to 3 quarts per acre as a broadcast spray or apply a 0.75-percent solution with hand-held equipment for partial control. For best results, treat during late summer or fall months when plants are actively growing and in full bloom. Due to the dense nature of the vegetation, which may prevent good spray coverage and uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop.

**Quackgrass / Kikuyugrass / Muhly, wirestem**—Apply 1.5 to 2.3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment when most quackgrass or wirestem muhly is at least 8 inches in height (3- to 4-leaf stage of growth) and actively growing. Allow 3 or more days after application before tillage.

**Reed, giant / Ice Plant**—For control of giant reed and ice plant, apply a 1.5-percent solution of this product with hand-held equipment when plants are actively growing. For giant reed, best results are obtained when applications are made in late summer to fall.

**Salvinia, giant**—Apply as a 2.0% v/v spray-to-wet solution with 0.5 to 2.0% v/v of a nonionic surfactant containing at least 70% active ingredient. For broadcast applications, apply 3 to 3.75 quarts of this product with an aquatic approved surfactant system containing 0.1% v/v nonionic organosilicone and 0.25% v/v nonionic spreader sticker surfactant in 3 to 40 gallons per acre as a broadcast treatment.

**Spatterdock**—Apply 3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Apply when most plants are in full bloom. For best results, apply during the summer or fall months.

**Sweet potato, wild**—Apply this product as a 1.5-percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be required. Allow the plant to reach the specified stage of growth before retreatment.

**Thistle: Canada, artichoke**—Apply 1.5 to 2.3 quarts of this product per acre as a broadcast spray or as a 1.5-percent solution with hand-held equipment for Canada thistle. To control artichoke thistle, apply a 2-percent solution as a spray-to-wet application. Apply when target plants are actively growing and are at or beyond the bud stage of growth.

**Torpedograss**—Apply 3 to 3.75 quarts of this product per acre as a broadcast spray or as a 0.75- to 1.5-percent solution with hand-held equipment to provide partial control of torpedograss. Use the lower rates under terrestrial conditions, and the higher rates under partially submerged or a floating mat condition. Repeat treatments will be required to maintain such control.

**Tules, common**—Apply this product as a 1.5-percent solution with hand-held equipment. Apply to actively growing plants at or beyond the seedhead stage of growth.

After application, visual symptoms will be slow to appear and may not occur for 3 or more weeks.

**Waterhyacinth**—Apply 2.5 to 3 quarts of this product per acre as a broadcast spray or apply a 0.75- to 1-percent solution with hand-held equipment. Apply when target plants are actively growing and at or beyond the early bloom stage of growth. After application, visual symptoms may require 3 or more weeks to appear with complete necrosis and decomposition usually occurring within 60 to 90 days. Use the higher rates when more rapid visual effects are desired.

**Waterlettuce**—For control, apply a 0.75- to 1-percent solution of this product with hand-held equipment to actively growing plants. Use higher rates where infestations are heavy. Best results are obtained from mid-summer through winter applications. Spring applications may require retreatment.

**Waterprimrose**—Apply this product as a 0.75-percent solution using hand-held equipment. Apply to plants that are actively growing at or beyond the bloom stage of growth, but before fall color changes occur. Thorough coverage is necessary for best control.

**Other perennials listed on this label**—Apply 2.3 to 3.75 quarts of this product per acre as a broadcast spray or as a 0.75- to 1.5-percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached early head or early bud stage of growth.

## 9.3 Woody Brush and Trees

Apply this product after full leaf expansion, unless otherwise directed. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of growth. Best results are obtained when application is made in late summer or fall after fruit formation.

In arid areas, best results are obtained when applications are made in the spring to early summer when brush species are at high moisture content and are flowering.

Ensure thorough coverage when using spray-to-wet treatments using hand-held equipment. When using hand-held equipment for low-volume directed-spray spot treatments, apply a 4- to 8-percent solution of this product.

Symptoms may not appear prior to frost or senescence with fall treatments.

Allow 7 or more days after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

WEED SPECIES	BROADCAST RATE (QT/A)	HAND-HELD SPRAY-TO-WET % SOLUTION
Alder	2.3 – 3.0	0.75 – 1.2
Ash*	1.5 – 3.75	0.75 – 1.5
Aspen, quaking	1.5 – 2.3	0.75 – 1.2
Bearclover (Bearmat)*	1.5 – 3.75	0.75 – 1.5
Beech*	1.5 – 3.75	0.75 – 1.5
Birch	1.5	0.75
Blackberry	2.3 – 3.0	0.75 – 1.2
Blackgum	1.5 – 3.75	0.75 – 1.5
Bracken	1.5 – 3.75	0.75 – 1.5
Broom; French, Scotch	1.5 – 3.75	1.2 – 1.5
Buckwheat, California*	1.5 – 3.0	0.75 – 1.5
Cascara*	1.5 – 3.75	0.75 – 1.5
Castorbean	—	1.5
Catsclaw*	—	1.2 – 1.5
Ceanothus*	1.5 – 3.75	0.75 – 1.5
Chamise*	1.5 – 3.75	0.75
Cherry; bitter, black, pin	1.5 – 3.75	1.0 – 1.5
Cottonwood, eastern	1.5 – 3.75	0.75 – 1.5
Coyote brush	2.3 – 3.0	1.2 – 1.5
Cypress; swamp, bald	1.5 – 3.75	0.75 – 1.5
Deerweed	1.5 – 3.75	0.75 – 1.5
Dewberry	2.3 – 3.0	0.75 – 1.2
Dogwood*	3.0 – 3.75	1.0 – 2.0
Elderberry	1.5	0.75
Elm*	1.5 – 3.75	0.75 – 1.5
Eucalyptus	—	1.5
Gallberry	1.5 – 3.75	0.75 – 1.5
Gorse*	1.5 – 3.75	0.75 – 1.5
Hackberry, western	1.5 – 3.75	0.75 – 1.5
Hasardia*	1.5 – 3.0	0.75 – 1.5
Hawthorn	1.5 – 2.3	0.75 – 1.2
Hazel	1.5	0.75
Hickory*	3.0 – 3.75	1.0 – 2.0
Honeysuckle	2.3 – 3.0	0.75 – 1.2
Hornbeam, American*	1.5 – 3.75	0.75 – 1.5
Huckleberry	1.5 – 3.75	0.75 – 1.5
Ivy, poison	3.0 – 3.75	1.5

Knotweed; Bohemian, Giant, Japanese**	—	—
Kudzu	3.0	1.5
Locust, black*	1.5 – 3.0	0.75 – 1.5
Madrone resprouts*	—	1.5
Magnolia, sweetbay	1.5 – 3.75	0.75 – 1.5
Manzanita*	1.5 – 3.75	0.75 – 1.5
Maple, red	1.0 – 3.75	0.75 – 1.2
Maple, sugar	—	0.75 – 1.2
Maple, vine*	1.5 – 3.75	0.75 – 1.5
Monkey flower*	1.5 – 3.0	0.75 – 1.5
Oak; black, white*	1.5 – 3.0	0.75 – 1.5
Oak; northern, pin	1.5 – 3.0	0.75 – 1.2
Oak, poison	3.0 – 3.75	1.5
Oak, post	2.3 – 3.0	0.75 – 1.2
Oak, red	—	0.75 – 1.2
Oak, scrub*	1.5 – 3.0	0.75 – 1.5
Oak, southern red	1.5 – 3.75	1.0 – 1.5
Orange, Osage	1.5 – 3.75	0.75 – 1.5
Peppertree, Brazilian (Florida holly)*	1.5 – 3.75	1.5
Persimmon*	1.5 – 3.75	0.75 – 1.5
Pine	1.5 – 3.75	0.75 – 1.5
Poplar, yellow*	1.5 – 3.75	0.75 – 1.5
Prunus	1.5 – 3.75	1.0 – 1.5
Raspberry	2.3 – 3.0	0.75 – 1.2
Redbud, eastern	1.5 – 3.75	0.75 – 1.5
Redcedar, eastern	1.5 – 3.75	0.75 – 1.5
Rose, multiflora	1.5	0.75
Russian olive*	1.5 – 3.75	0.75 – 1.5
Sage, black	1.5 – 3.0	0.75
Sage, white*	1.5 – 3.0	0.75 – 1.5
Sage brush, California	1.5 – 3.0	0.75
Salmonberry	1.5	0.75
Saltbush	—	1.0
Saltcedar**	1.5 – 3.75	0.75 – 1.5
Sassafras*	1.5 – 3.75	0.75 – 1.5
Sea Myrtle	—	1.0
Sourwood*	1.5 – 3.75	0.75 – 1.5
Sumac; laurel, poison, smooth, sugarbush, winged*	1.5 – 3.0	0.75 – 1.5
Sweetgum	1.5 – 2.3	0.75 – 1.5
Swordfern*	1.5 – 3.75	0.75 – 1.5
Tallowtree, Chinese	—	0.75
Tan oak resprouts*	—	1.5
Thimbleberry	1.5	0.75
Tobacco, tree*	1.5 – 3.0	0.75 – 1.5
Toyon*	—	1.5
Trumpetcreeper	1.5 – 2.3	0.75 – 1.2
Vine maple*	1.5 – 3.75	0.75 – 1.5
Virginia creeper	1.5 – 3.75	0.75 – 1.5
Waxmyrtle, southern*	1.5 – 3.75	1.5
Willow	2.3	0.75
Yerba Santa, California*	—	1.5

\*Partial control

\*\*Refer to specific instructions below

**Alder / Blackberry / Dewberry / Honeysuckle / Oak, Post / Raspberry**—For control, apply 2.3 to 3 quarts per acre as a broadcast spray or as a 0.75- to 1.2-percent solution with hand-held equipment.

**Aspen, Quaking / Hawthorn / Trumpetcreeper**—For control, apply 1.5 to 2.3 quarts of this product per acre as a broadcast spray or as a 0.75- to 1.2-percent solution with hand-held equipment.

**Birch / Elderberry / Hazel / Salmonberry / Thimbleberry**—For control, apply 1.5 quarts per acre of this product as a broadcast spray or as a 0.75-percent solution with hand-held equipment.

**Broom: French, Scotch**—For control, apply a 1.2- to 1.5-percent solution with hand-held equipment.

**Buckwheat, California / Hasardia / Monkey Flower / Tobacco, Tree**—For partial control of these species, apply a 0.75- to 1.5-percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

**Castorbean**—For control, apply a 1.5-percent solution of this product with hand-held equipment.

**Catsclaw**—For partial control, apply a 1.2- to 1.5-percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

**Cherry: Bitter, Black, Pin / Oak, Southern Red / Sweet Gum / Prunus**—For control, apply 1.5 to 3.75 quarts of this product per acre as a broadcast spray or as a 1- to 1.5-percent solution with hand-held equipment.

**Coyote brush**—For control, apply a 1.2- to 1.5-percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

**Dogwood / Hickory**—For partial control, apply a 1- to 2-percent solution of this product with hand-held equipment or 3 to 3.75 quarts per acre as a broadcast spray.

**Eucalyptus, Bluegum**—For control of eucalyptus resprouts, apply a 1.5-percent solution of this product with hand-held equipment when resprouts are 6- to 12-feet tall. Ensure complete coverage. Apply when plants are actively growing. Avoid application to drought-stressed plants.

**Knotweed: Bohemian, Giant, Japanese (*Polygonum boeticum*, *P. sachalinense* and *P. cuspidatum*)**

**Stem Injection.** See the "Hollow Stem Injection" section of this label.

**Cut Stem.** Cut stems cleanly just below the 2<sup>nd</sup> or 3<sup>rd</sup> node above the ground. Immediately apply 0.36 fluid ounce (10 mLs) of a 50-percent solution of this product into the "well" or remaining internode. Ensure that removed upper plant material is carefully gathered and discarded so that it will not contact soil and regenerate plants from sprouting buds. Use of a bio-barrier such as cardboard, plywood or plastic sheeting is recommended.

The combined total for all treatments must not exceed 8 quarts per acre. At 10 mL of a 50-percent solution, approximately 1500 stems per acre may be treated.

**Kudzu**—For control, apply 3 quarts of this product per acre as a broadcast spray or as a 1.5-percent solution with hand-held equipment. Repeat applications will be required to maintain control.

**Maple, Red**—For control, apply as a 0.75- to 1.2-percent solution with hand-held equipment when leaves are fully developed. For partial control, apply 1 to 3.75 quarts of this product per acre as a broadcast spray.

**Maple, Sugar / Oak: Northern, Pin, Red**—For control, apply as a 0.75- to 1.2-percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

**Peppertree, Brazilian (Holly, Florida) / Waxmyrtle, Southern**—For partial control, apply this product as a 1.5-percent solution with hand-held equipment.

**Poison Ivy / Poison Oak**—For control, apply 3 to 3.75 quarts of this product per acre as a broadcast spray or as a 1.5-percent solution with hand-held equipment. Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.

**Rose, Multiflora**—For control, apply 1.5 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.

**Sage, Black / Sagebrush, California / Chamise / Tallowtree, Chinese**—For control of these species, apply a 0.75-percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

**Saltbush, Sea myrtle**—For control, apply this product as a 1-percent solution with hand-held equipment.

**Saltcedar**—For partial control, apply a 1- to 2-percent solution of this product with hand-held equipment or 3 to 3.75 quarts per acre as a broadcast spray. For control, apply a 1- to 2-percent solution of this product mixed with 0.25 percent Arsenal with hand-held equipment. For control using broadcast applications, apply 1.5 quarts of this product in a tank-mix with 1 pint of Arsenal to plants less than 6 feet tall. To control saltcedar greater than 6 feet tall using broadcast applications, apply 3 quarts of this product in a tank-mix with 2 pints of Arsenal.

**Willow**—For control, apply 2.3 quarts of this product per acre as a broadcast spray or as a 0.75-percent solution with hand-held equipment.

**Other woody brush and trees listed in this label**—For partial control, apply 1.5 to 3.75 quarts of this product per acre as a broadcast spray or as a 0.75- to 1.5-percent solution with hand-held equipment.

## 10.0 LIMIT OF WARRANTY AND LIABILITY

Monsanto Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

To the fullest extent permitted by law, buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

This Company does not warrant any product reformulated or repackaged from this product except in accordance with this Company's stewardship requirements and with express written permission from this Company.

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EPA Reg No. 524-343

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MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MISSOURI, 63167 U.S.A.  
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061709



## ATENCIÓN:

Esta etiqueta de muestra se entrega únicamente para información general.

- Este producto pesticida puede no estar todavía disponible o aprobado para la venta o utilización en su localidad.
- Usted tiene la responsabilidad de cumplir todas las leyes federales, estatales y locales, así como todas las reglamentaciones relativas a la utilización de pesticidas.
- Antes de utilizar un pesticida, asegúrese de que esté aprobado en su estado o localidad.
- Su estado o localidad puede exigir precauciones adicionales e instrucciones para la utilización de este producto que no están incluidas aquí.
- Monsanto no garantiza el lo completo ni la certeza de esta etiqueta de la especímen. La información encontró en esta etiqueta puede diferir de la información encontró en la etiqueta del producto. Usted debe tener consigo la etiqueta aprobada por la agencia EPA cuando utilice el producto y debe leer y respetar todas las instrucciones en la etiqueta.
- No debe basarse sobre las precauciones, las instrucciones de utilización y cualquier otra información en esta etiqueta para utilizar algún otro producto similar.
- Siempre siga las precauciones y las instrucciones para el uso en la etiqueta del pesticida que usted utiliza.



### Instrucciones de uso en medios acuáticos y otros sitios no dedicados a cultivos.

EVITE EL CONTACTO DEL HERBICIDA CON EL FOLIAJE, TALLOS, RAICES NO LEÑOSAS EXPUESTAS O FRUTOS EXPUESTOS DE LAS COSECHAS, PLANTAS Y ARBOLES DESEABLES, EN CASO CONTRARIO ES PROBABLE QUE SUFRAN GRAVES DANOS O SEAN DESTRUIDOS TOTALMENTE.

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Antes de usar este producto, lea la etiqueta en su totalidad.

Uselo solamente de acuerdo con las instrucciones de la etiqueta.

No todos los productos enumerados en esta etiqueta han sido registrados para su uso en California. Verifique el estado de registro de cada producto en California antes de utilizarlo.

Antes de comprar o usar el producto, lea "LIMITES EN LA GARANTIA Y EN LA RESPONSABILIDAD" en la última sección de la etiqueta. Si las condiciones son inaceptables para usted, devuelva el producto inmediatamente sin abrir el recipiente.

ESTE ES UN PRODUCTO PARA USARSE TAL Y COMO ESTA PREPARADO. MONSANTO NO LO HA DISEÑADO NI LO HA REGISTRADO PARA QUE SEA REFORMULADO O LA VOLVER A EMPAQUETAR. VEA LA ETIQUETA DEL ENVASE INDIVIDUAL PARA ENTERARSE DE LAS LIMITACIONES DE REEMPAQUE.

#### INFORMACIÓN DE PRODUCTO

## 1.0 INGREDIENTES

#### INGREDIENTE ACTIVO:

*Glifosato, N-(fosfonometil)glicina, en forma de su sal de isopropilamina .....	53.8%
OTROS INGREDIENTES:.....	46.2%
	100.0%

\*Contiene 648 gramos por litro o 5.4 libras por galón americano del ingrediente activo glifosato, en forma de su sal de isopropilamina. Equivalente a 480 gramos por litro o 4.0 libras por galón americano del ácido, glifosato.

No se han otorgado licencias bajo ninguna patente que no sea de los Estados Unidos.

## 2.0 TELEFONOS IMPORTANTES

PARA INFORMACION SOBRE EL PRODUCTO O AYUDA PARA UTILIZAR  
ESTE PRODUCTO, LLAME GRATIS AL  
1-800-332-3111.

EN CASO DE QUE SE PRESENTE UNA EMERGENCIA RELACIONADA CON  
ESTE PRODUCTO, O PARA OBTENER AYUDA MEDICA, LLAME POR COBRAR  
A CUALQUIER HORA DEL DIA O DE LA NOCHE, AL TELEFONO.  
(314) 694-4000.

## 3.0 ADVERTENCIAS

### 3.1 Riesgos para seres humanos y animales domésticos

Manténgase fuera del alcance de los niños.

## ¡PRECAUCIÓN!

Quítese la ropa contaminada y lávela antes de volver a usarla.

Después de manipular este producto, lávese bien con agua y jabón.

### 3.2 Riesgos al medio ambiente

No contamine el agua cuando lave los equipos ni cuando elimine las aguas de lavado de los mismos. El tratamiento de malezas acuáticas podría provocar el agotamiento del oxígeno debido a su consumo durante la descomposición de las plantas muertas. Esta pérdida del oxígeno podría provocar, a su vez, la asfixia de los peces.

En caso de DERRAME o FUGA de este producto, recójalo con materiales absorbentes y envíe los residuos a un vertedero.

### 3.3 Riesgos de orden físico o químico

Para mezclar, almacenar y aplicar la solución de este producto, se deben usar solamente recipientes de acero inoxidable, aluminio, fibra de vidrio, plástico o recipientes de acero recubiertos internamente con plástico.

NO MEZCLE, ALMACENE O APLIQUE ESTE PRODUCTO O SUS SOLUCIONES PARA ROCIAR EN RECIPIENTES O TANQUES ROCIADORES DE ACERO GALVANIZADO O DE ACERO NO RECUBIERTO (EXCEPTO SI ES ACERO INOXIDABLE). Este producto o la solución para rociar reaccionan con el material de dichos recipientes y tanques, lo cual produce hidrógeno, que puede formar una mezcla de gases altamente combustibles. Si esta mezcla de gases entra en contacto con llamas, chispas, el soplete de un soldador, un cigarrillo encendido o cualquier otra fuente de encendido, puede inflamarse o explotar y causar heridas graves a personas.

## INSTRUCCIONES PARA EL USO

El uso de este producto de cualquier manera que sea inconsistente con las instrucciones dadas en la etiqueta es una violación de las leyes federales. Este producto sólo puede utilizarse de acuerdo a las indicaciones sobre el modo de empleo que figuran en esta etiqueta o en la etiqueta adicional de Monsanto impresa por separado. Las etiquetas complementarias pueden encontrarse en las páginas web [www.cdns.net](http://www.cdns.net) o [www.greenbook.net](http://www.greenbook.net) o bien, solicítelas al vendedor minorista autorizado de Monsanto o al representante de la Compañía Monsanto. Para verificar requisitos específicos de su tribu o estado, consulte con la agencia responsable de la regulación del uso de pesticidas.

## 4.0 ALMACENAMIENTO Y DESECHO

Son fundamentales el almacenamiento y la eliminación adecuados de los pesticidas para evitar la exposición de las personas y el medio ambiente como consecuencia de pérdidas y derrames del producto, excedentes o desechos y actos de vandalismo. No permita que este producto contamine el agua, los alimentos de las personas y animales o las semillas por medio del almacenamiento y la eliminación.

**ALMACENAMIENTO DE PESTICIDAS:** ALMACENE POR ENCIMA DE 5°F (-15°C) PARA EVITAR QUE EL PRODUCTO SE CRISTALICE. Los cristales se depositarán en el fondo. Si se permite la cristalización, coloque en un ambiente cálido a 68°F (20°C) durante varios días para que vuelva a disolverse y haga rodar el recipiente de agitación o recílelo en recipientes de granel mínimo para mezclar bien antes de usar. Guarde los pesticidas lejos de los alimentos para personas, los alimentos para mascotas, los alimentos para animales, las semillas, los fertilizantes y los materiales de uso veterinario. Mantenga el envase bien cerrado para evitar derramamientos y contaminación.

**ENVASE DE PESTICIDA:** Para evitar desechos, use todo el material contenido en este envase, incluyendo los residuos del enjuague, aplicándolo según las indicaciones de la etiqueta. Si no es posible evitar los desechos, ofrezca el producto restante a una planta de eliminación de desechos o a un programa de eliminación de pesticidas. Estos programas suelen ser manejados por gobiernos estatales o locales o por la industria. Todos los desechos deben seguir los procedimientos federales, estatales y locales aplicables.

**MANIPULACIÓN Y ELIMINACIÓN DEL ENVASE:** Vea en la etiqueta del envase las instrucciones de manipulación y eliminación, así como las limitaciones de recarga.

## 5.0 INFORMACION GENERAL (Cómo funciona este producto)

**Descripción del producto:** Este producto es un herbicida sistémico de aplicación post-emergencia foliar, sin actividad residual en el suelo. Controla un amplio espectro de malezas anuales, malezas perennes, matorrales leñosos y árboles. Está formulado como un líquido soluble en agua y puede aplicarse utilizando equipos convencionales después de su dilución y mezclado con agua o con otros medios de transporte según las instrucciones de la etiqueta.

**Aparición de los síntomas:** Este producto se mueve dentro de la planta desde el punto de aplicación sobre el follaje hasta las raíces. Los efectos visibles incluyen que la planta se marchite y se vuelva amarilla de forma gradual, hasta que su parte exterior se torne completamente color café; mientras tanto, las partes de la planta que están bajo tierra se deterioran completamente. Los efectos visibles en la mayoría de las malezas anuales se pueden apreciar entre los 2 y los 4 días después de la aplicación, pero en la mayoría de las malezas perennes es posible que no se observen hasta después de 7 días o más. El frío extremo o el cielo muy nublado después de la aplicación pueden retardar la actividad del producto y hacer que el efecto visual se demore.

**Etapa de malezas:** Las malezas anuales son más fáciles de controlar cuando son pequeñas. Para lograr el mejor control de la mayoría de las malezas perennes, el tratamiento debe realizarse en las últimas etapas de crecimiento, cerca de su etapa de madurez. Refiérase a las secciones "MALEZAS CONTROLADAS" para ver instrucciones específicas para cada tipo de maleza. Aplique siempre la mayor cantidad de producto dentro del rango indicado cuando las malezas son muy densas o cuando crecen en áreas no tocadas (no cultivadas). Puede haber una disminución de los resultados cuando se traten malezas afectadas por enfermedades o dañadas por los insectos, malezas cubiertas con mucho polvo o malezas en malas condiciones de crecimiento.

**Prácticas culturales:** Se podrá observar una reducción en el efecto si se aplica el producto a malezas anuales o perennes que hayan sido segadas, que hayan servido de alimento para animales o hayan sido cortadas, y que no hubiesen crecido nuevamente hasta el nivel recomendado para el tratamiento.

**Resistencia a la lluvia:** La lluvia torrencial poco después de la aplicación lavará el producto del follaje y se requerirá una nueva aplicación para obtener un control adecuado.

**Modo de acción en las plantas:** El ingrediente activo de este producto inhibe la producción de una enzima en las plantas y microorganismos que es esencial para la formación de aminoácidos específicos.

**No actividad en el suelo:** Las malezas deben haber emergido en el momento de la aplicación para poder ser controladas por este producto. Las malezas que germinen de semillas después de la aplicación no serán controladas. Las plantas no emergidas con rizomas o raíces subterráneas de malezas perennes no conectadas no se verán afectadas por el herbicida y continuarán creciendo.

**Cantidades de aplicación máximas:** Las cantidades de aplicación o uso máximas especificadas en esta etiqueta están expresadas en unidades de volumen (onzas fluidas o cuartos de galón) de este producto por acre. No obstante, las dosis máximas de aplicación permitidas corresponden al uso de este producto en combinación con otros herbicidas que contienen glifosato como principio activo, tanto si son aplicados como mezclas de tanque o por separado, en función de las libras totales de glifosato (libras de ácido equivalente) por acre. Si se aplica más de un producto que contiene glifosato al mismo sitio dentro del mismo año, debe asegurarse de que el uso total de glifosato (libras de ácido equivalente) no exceda el máximo permitido. El total combinado de todos los tratamientos no debe exceder 8 cuartos de galón de este producto (8 libras de ácido glifosato) por acre por año. Vea en la sección "INGREDIENTES" de esta etiqueta información importante sobre el producto.

### ATENCION

EVITE EL CONTACTO DEL HERBICIDA CON EL FOLLAJE, TALLOS, RAÍCES NO LEÑOSAS EXPUESTAS O FRUTOS EXPUESTOS DE LAS COSECHAS, PLANTAS Y ÁRBOLES DESEABLES. EN CASO CONTRARIO ES PROBABLE QUE SUFRAN GRAVES DAÑOS O SEAN DESTRUIDOS TOTALMENTE.

EVITE EL ACARREO. CUANDO EL PRODUCTO SE APLIQUE, SE DEBE TENER MUCHO CUIDADO PARA PREVENIR EL DANO A PLANTAS Y CULTIVOS DESEABLES.

No permita que la solución del herbicida se nebulice, gotee, sea acarreada o salpique sobre la vegetación deseable. Una cantidad pequeña puede ser suficiente para causar daños graves o destruir las cosechas, plantas u otras áreas que no se desea tratar. La probabilidad de que ocurran daños por el uso de este producto aumenta cuando hay muchas ráfagas de viento, a medida que aumenta la velocidad del viento, cuando la velocidad del viento cambia constantemente o cuando existen otras condiciones meteorológicas que favorecen la dispersión del rociado. Cuando se esté aplicando el producto con un rociador, evite la combinación de presiones y tipos de boquilla que puedan dar como resultado salpicaduras o partículas finas (niebla), que tienen muchas probabilidades de que el producto sea acarreado. EVITE LA APLICACION A ALTA VELOCIDAD O PRESION EXCESIVAS.

**NOTA:** El uso de este producto de cualquier manera contraria a las indicaciones contenidas en este libreto, puede resultar en lesiones a personas, animales o cosechas o pueden ocurrir otras consecuencias no deseadas.

## 5.1 Gestión de resistencia de malezas

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El glifosato, el principio activo de este producto, es un herbicida del grupo 9 según el sistema de clasificación de efecto de la Weed Science Society of America. Todas las poblaciones de malezas pueden contener plantas naturalmente resistentes a los herbicidas del grupo 9. Las especies de malezas resistentes a los herbicidas del grupo 9 pueden tratarse con buenos resultados utilizando herbicidas de otro grupo o adoptando otras prácticas culturales o mecánicas.

Para reducir al mínimo la incidencia de biotipos resistentes al glifosato, respete las siguientes recomendaciones generales con respecto a la gestión de malezas:

- Haga un reconocimiento del sitio de la aplicación antes y después de haber aplicado herbicidas.
- Comience a controlar las malezas cuanto antes, cuando sean todavía relativamente pequeñas.
- Donde sea apropiado, incorpore otros herbicidas y prácticas culturales o mecánicas como parte del sistema de control de malezas.
- Utilice la cantidad indicada en la etiqueta para las malezas más difíciles de controlar en el sitio. Evite las mezclas de tanque con otros herbicidas que reducen la eficacia de este producto (por antagonismo) o las recomendaciones de mezclas de tanque que alientan la utilización de cantidades de este producto inferiores a las recomendaciones de la etiqueta.
- Controle las malezas omitidas e impida que echen semilla.
- Limpie los equipos antes de trasladarse de un sitio a otro para reducir al mínimo la propagación de semillas de malezas.
- Utilice semillas comerciales nuevas con la menor cantidad posible de semillas de malezas.
- Informe todo incidente por falta de rendimiento reiterado de este producto en una maleza determinada al representante de Monsanto, vendedor minorista de su localidad o agente de extensión del condado.

## 5.2 Recomendaciones de gestión para biotipos resistentes al glifosato

**NOTA:** Es fundamental realizar una prueba apropiada para determinar si la maleza es resistente al glifosato. Comuníquese con su representante de Monsanto para determinar si se ha confirmado la resistencia a algún biotipo de maleza determinada en su región. Las recomendaciones de control para biotipos que se confirmaron como resistentes al glifosato se dan a conocer con la publicación por separado de etiquetas o Fichas Técnicas complementarias para ese producto, y puede solicitarlas al vendedor minorista o a su representante de Monsanto.

Debido a que no es posible determinar la existencia de nuevas malezas resistentes al glifosato hasta que se haya utilizado el producto y se cuente con la confirmación científica correspondiente, Monsanto Compañía no será responsable de ninguna pérdida que pudiera tener lugar en el caso de que este producto no lograra controlar de forma eficaz los biotipos de malezas resistentes al glifosato.

Siga las prácticas correctas de gestión de malezas para reducir la propagación de biotipos resistentes al glifosato confirmados:

- Si en su zona existe naturalmente un biotipo resistente, para lograr su control puede mezclar este producto en un tanque o aplicarlo secuencialmente con un herbicida debidamente etiquetado con efecto diferente.
- También se pueden utilizar prácticas de control culturales y mecánicas según corresponda.
- Haga un reconocimiento de los lugares tratados después de las aplicaciones de herbicida y controle las omisiones de biotipos resistentes antes de que echen semilla.
- Limpie minuciosamente los equipos antes de abandonar los lugares que se sabe que contienen biotipos resistentes.

## 6.0 MEZCLA

Limpie inmediatamente con abundante cantidad de agua las piezas del rociador después de utilizar este producto.

**NOTA:** PUEDE HABER UNA DISMINUCIÓN DE LOS RESULTADOS SI SE UTILIZA AGUA QUE CONTIENE TIERRA, COMO AGUA VISIBLEMENTE ENLODADA O AGUA DE ESTANQUES Y ZANJAS NO TRANSPARENTE.

## 6.1 Mezcla con agua

Este producto se mezcla fácilmente con agua. Mezcle las soluciones de rociado de este producto de la siguiente manera. Inicialmente, llene el tanque de mezclado o rociado con agua limpia. Agregue la cantidad etiquetadas de este producto hacia el final del proceso de llenado y mezcle con cuidado. La solución de rociado puede formar espuma durante la mezcla. Para prevenir o reducir al mínimo la formación de espuma, mezcle con cuidado,

tapone las derivaciones y mangueras de retorno en el fondo del tanque y, si es necesario, utilice un agente aprobado para evitar la formación de espuma o eliminarla.

## 6.2 Mezclas de tanque

Cuando este producto se mezcla en un tanque con otros productos, consulte las etiquetas de los productos mezclados para ver los sitios no cultivados y las dosis de aplicación aprobados. Lea y siga con cuidado las declaraciones preventivas y toda la demás información incluida en las etiquetas de los herbicidas utilizados. Utilizar conforme a las declaraciones preventivas más restrictivas correspondientes a cada producto de la mezcla. Para la mezcla en tanque, puede utilizarse cualquier cantidad de este producto que se encuentre dentro del rango indicado en la etiqueta.

Cuando esta etiqueta indique una mezcla de tanque con un ingrediente activo genérico como diurón, 2,4-D o dicamba, el usuario será responsable de asegurarse de que la etiqueta del producto de mezcla permita la aplicación específica.

El comprador y todos los usuarios serán responsables de cualquier pérdida o daño que pudiera ocurrir como consecuencia del uso o manipulación de mezclas de este producto con herbicidas u otros materiales que no estén expresamente incluidos en esta etiqueta. La mezcla de este producto con herbicidas u otros materiales no especificados en esta etiqueta puede dar como resultado una reducción en su rendimiento.

## 6.3 Procedimiento para mezclas de tanque

Cuando realice la mezcla en un tanque, lea y siga cuidadosamente las indicaciones, declaraciones preventivas y toda la demás información incluida en las etiquetas de los productos utilizados. Agregue el producto de la mezcla al tanque según las indicaciones de la etiqueta. Agite continuamente y agregue la cantidad recomendada de este producto.

Agite continuamente hasta usar totalmente el contenido del tanque. Si se deja que la mezcla para rociar se asiente, agite bien para que la mezcla vuelva a estar en suspensión antes de continuar con el rociado.

A fin de minimizar la formación de espuma, mantenga las tuberías de retorno lo más cerca del fondo del tanque. El tamaño del cernidor en la boquilla o de los cernidores en las tuberías no debe ser menor al número 50.

Siempre determine previamente la compatibilidad de la mezcla de este producto, que viene en tanque rotulado, con agua como vehículo, mezclando cantidades pequeñas proporcionales con anticipación. Asegúrese de que la mezcla en tanque específica esté registrada para su aplicación en el área deseada.

Vea la sección "Mezclas de tanque" para las precauciones adicionales.

## 6.4 Mezcla de soluciones en porcentaje

Prepare la cantidad deseada de la solución para rociar, mezclando las proporciones de este producto con agua, según se muestra en la siguiente tabla:

### Solución para rociar

Volumen Deseado	Cantidad de herbicida AquaMaster					
	0.5%	0.75%	1%	1.5%	4%	8%
1 gal	2/3 oz	1 oz	1.3 oz	2 oz	5 oz	10 oz
25 gal	1 pt	1.5 pt	1 qt	1.5 qt	4 qt	2 gal
100 gal	2 qt	3 qt	1 gal	1.5 gal	4 gal	8 gal
2 cucharadas = 1 onza fluida						

Cuando se usen rociadores tipo mochila, o para bombeo, se recomienda que este producto se mezcle con agua en un recipiente grande. Llene el rociador con la solución ya lista.

## 6.5 Surfactante

Este producto requiere el uso de un surfactante no iónico a menos que se indique lo contrario. Cuando utilice este producto, a menos que se especifique lo contrario, mezcle 2 o más cuartos de galón de surfactante no iónico por cada 100 galones de solución para rociar. Si se aumenta la proporción de surfactante, es posible mejorar el rendimiento. Puede emplearse una mayor proporción de surfactante, por ejemplo, en matorrales leñosos, árboles y enredaderas difíciles de controlar, volúmenes de agua elevados, condiciones ambientales adversas, malezas difíciles de controlar, malezas bajo tensión, surfactantes con menos del 70 por ciento de ingrediente activo, mezclas de tanque, etc. Estos surfactantes no deben usarse a razón de más de 1 cuarto de galón por acre al realizar aplicaciones al voleo. Lea y siga siempre las indicaciones de la etiqueta del fabricante del surfactante para obtener los mejores resultados. Siga cuidadosamente todas las declaraciones preventivas y demás información que aparece en la etiqueta del surfactante.

## 6.6 Colorantes o tinturas

A este producto se le pueden agregar colorantes o tinturas para marcar, que sean aprobados para uso agrícola. Los colorantes o tinturas utilizados en las soluciones de rocio de este producto pueden reducir su rendimiento, especialmente a bajas concentraciones del producto o a bajas diluciones. Para usar los colorantes y tinturas siga las instrucciones del fabricante.

## 6.7 Aditivos de reducción de deriva

Se pueden utilizar aditivos para el control de la deriva en todos los tipos de equipo, a excepción de aplicadores por rotación y barras de esponja. Cuando se use un aditivo para el control de la deriva, lea y cumpla cuidadosamente con las declaraciones preventivas y toda la información adicional que aparezca en la etiqueta del aditivo. El uso de aditivos para el control de la deriva puede afectar la cobertura del rocio, lo que puede dar como resultado una reducción en el rendimiento.

## 7.0 EQUIPOS Y TÉCNICAS PARA LA APLICACIÓN

No use ningún sistema de irrigación para aplicar este producto.

APLIQUE ESTAS SOLUCIONES PARA ROCIAR UTILIZANDO EQUIPOS DEBIDAMENTE MANTENIDOS Y CALIBRADOS QUE SEAN CAPACES DE ROCIAR EL VOLUMEN DESEADO.

### MANEJO DE LA DERIVA POR ROCIADO

EVITE LA DERIVA. DEBE USARSE EXTREMO CUIDADO EN LA APLICACIÓN DE ESTE PRODUCTO PARA EVITAR DAÑOS A PLANTAS Y CULTIVOS DESEADOS.

No permita que la solución del herbicida empañe, gotee, se derive o salpique sobre la vegetación deseada, ya que minúsculas cantidades de este producto pueden causar daños graves o destrucción del cultivo, plantas u otras áreas que no se pretendía tratar.

Es la responsabilidad del aplicador evitar la deriva por rociado en el lugar de aplicación. La interacción de varios factores relacionados con el clima y el equipo determina la posibilidad de deriva por rociado. El aplicador y el cultivador son responsables de considerar todos estos factores al tomar decisiones.

## 7.1 Equipo aéreo

NO APLIQUE ESTE PRODUCTO CON EQUIPOS AEREOS EXCEPTO BAJO LAS CONDICIONES QUE SE ESPECIFICAN EN ESTE LIBRETO.

PARA LA APLICACION AEREA EN CALIFORNIA, CONSULTE EL SUPLEMENTO FEDERAL PARA APLICACIONES AEREAS EN DICHO ESTADO, PARA CONOCER LAS INSTRUCCIONES, LIMITACIONES Y REQUISITOS ESPECIFICOS.

Este producto, cuando se lo mezcla en un tanque con dicamba, no se puede aplicar por pulverización aérea en California. En California sólo pueden aplicarse por pulverización aérea las fórmulas de 2,4-D amina.

PARA EVITAR DAÑAR LA VEGETACIÓN DESEADA, SE DEBEN MANTENER ZONAS TAMPÓN ADECUADAS.

Evite la aplicación directa sobre agua.

Use las proporciones etiquetados de este producto con 3 a 25 galones de agua por acre.

Asegúrese de que la aplicación sea uniforme. A fin de evitar que queden áreas sin tratar, que la aplicación no sea uniforme o que las aplicaciones se traslapen, se deben usar marcadores adecuados.

### MANEJO DE LA DERIVA POR ROCIADO AÉREO

Deben cumplirse los siguientes requisitos de control de deriva para evitar la deriva fuera del objetivo en las aplicaciones aéreas del producto a campos de cultivo. Estos requisitos no se aplican a usos de salud pública.

1. La distancia del pulverizador más externo en la barra distribuidora no debe exceder 3/4 del largo de la envergadura o rotor.

2. Los pulverizadores deben siempre apuntar hacia atrás, paralelos a la corriente de aire, nunca hacia abajo más de 45 grados. En los estados con reglamentos más estrictos.

### Importancia del tamaño de la gotita

La forma más eficaz de reducir la posibilidad de deriva es la aplicación de gotitas grandes. La mejor estrategia de manejo de la deriva es la aplicación de las gotitas más grandes que provean suficiente cobertura y control. La aplicación de gotitas más grandes reduce la posibilidad de deriva, pero no la evitará si las aplicaciones se realizan inadecuadamente o bajo condiciones ambientales desfavorables (vea las secciones de "Viento", "Temperatura y Humedad", e "Inversiones de temperatura" en esta etiqueta).

### Control del tamaño de la gotita

- **Volumen:** Use pulverizadores de velocidad de flujo alta para aplicar el mayor volumen de rociado práctico. Los pulverizadores con mayores velocidades de flujo producen gotitas más grandes.
- **Presión:** Use las presiones de rociado más bajas recomendadas para el pulverizador. La presión más alta reduce el tamaño de la gotita y no mejora la penetración del todo. Cuando sean necesarias velocidades de flujo mayores, use pulverizadores con velocidad de flujo mayor en lugar de aumentar la presión.
- **Número de pulverizadores:** Use el número mínimo de pulverizadores que provean cobertura uniforme.
- **Orientación del pulverizador:** Oriente los pulverizadores de modo que el rocio sea liberado hacia atrás, paralelo a la corriente de aire, produzca gotitas más grandes que en otras orientaciones. Una deflexión significativa de la horizontal reducirá el tamaño de la gotita y aumentará la posibilidad de deriva.
- **Tipo de pulverizador:** Use un tipo de pulverizador que esté diseñado para la aplicación prevista. Con la mayoría de los tipos de pulverizadores, los ángulos de rociado más angostos producen gotitas más grandes. Considere el uso de pulverizadores de deriva

baja. Los pulverizadores de flujo sólido orientados hacia atrás producen gotitas más grandes que otros tipos de pulverizador.

- **Largo de la barra distribuidora:** Para algunos tipos de uso, la reducción del largo efectivo de la barra distribuidora a menos de 3/4 de la envergadura o el largo del rotor puede reducir más la deriva sin reducir el ancho de la hilera (pasada).
- **Altura de la aplicación:** Las aplicaciones no deben realizarse a una altura mayor que 10 pies por encima de la copa de las plantas más grandes, a menos que se requiera mayor altura por razones de seguridad del aeroplano. La realización de las aplicaciones a la menor altura que sea segura reduce la exposición de las gotitas a la evaporación y el viento.

#### Ajuste de la hilera (pasada)

Cuando las aplicaciones se lleven a cabo con viento lateral, la banda de aspersión se desplazará a favor del viento. Por ello, en los extremos con o contra el viento del campo, el aplicador debe compensar este desplazamiento ajustando la trayectoria del aeroplano contraria al viento. La distancia de ajuste de la hilera debe aumentar, cuando aumenta la posibilidad de deriva (mayor viento, gotitas más pequeñas, etc.).

#### Viento

La posibilidad de deriva es menor con velocidades del viento entre 2 y 10 mph. Sin embargo, muchos factores, incluyendo el tamaño de las gotitas y el tipo de equipo determinan la posibilidad de deriva a una velocidad determinada. Debe evitarse la aplicación menos de 2 mph debida a la dirección variable del viento y la posibilidad alta de inversión. **NOTA:** El terreno local puede influir en los patrones de viento. Cada aplicador debe conocer los patrones (vientos) locales y cómo éstos afectan la deriva.

#### Temperatura y humedad

Cuando se realizan aplicaciones con humedad relativa baja, fije el equipo para que produzca gotitas más grandes para compensar por la evaporación. La evaporación de gotitas es más grave cuando las condiciones son calurosas y secas.

#### Inversiones de temperatura

No deben realizarse aplicaciones durante una inversión de temperatura debido a que es alta la posibilidad de deriva. Las inversiones de temperatura restringen la mezcla de aire vertical, lo que causa que pequeñas gotitas suspendidas permanezcan en una nube concentrada. Esta nube puede moverse en direcciones no predecibles debido a los vientos variables leves que son comunes durante las inversiones. Las inversiones de temperatura están caracterizadas por temperaturas en aumento con altitud y son comunes en las noches con cobertura de nubes limitada y poco o ningún viento. Comienzan a formarse cuando se mete el sol y a menudo continúan en la mañana. Su presencia puede indicarse por neblina en el suelo; sin embargo, si la neblina no está presente, las inversiones también pueden identificarse por el movimiento del humo desde una fuente del suelo o por el generador de humo de un aeroplano. El humo en capas que se mueve lateralmente en una nube concentrada (bajo condiciones de poco viento) indica una inversión, mientras que el humo que se mueve hacia arriba y se disipa rápidamente indica buena mezcla de aire vertical.

#### Áreas sensibles

Este producto sólo se debe aplicar cuando la posibilidad de deriva hacia zonas adyacentes susceptibles (como por ejemplo, áreas residenciales, masas de agua, hábitat conocido de especies amenazadas o en peligro de extinción, cultivos que no sean el objetivo) sea mínima, (es decir, cuando el viento sopla lejos de las áreas susceptibles).

#### Mantenimiento de aeronaves

EL CONTACTO PROLONGADO DE ESTE PRODUCTO CON PARTES DE ACERO QUE NO ESTA RECUBIERTO CON ALGUN TIPO DE PROTECCION, PUEDE DAR COMO RESULTADO LA CORROSION Y POSIBLEMENTE QUE LAS PARTES FALLEN. Es posible prevenir la corrosión recubriendo las partes con pintura orgánica, que cumpla con las especificaciones aeroespaciales MIL-C-38413. Al final de cada día de trabajo, para evitar la corrosión de las partes expuestas, lave muy bien el avión a fin de remover los residuos de este producto que se acumulan durante el rociado o por derramamientos. Las partes del tren de aterrizaje son extremadamente susceptibles.

## 7.2 Equipo de aplicación terrestre

Para aplicaciones al voleo por tierra, a menos que se especifique lo contrario en esta etiqueta o en otras etiquetas o Fichas Técnicas publicadas por Monsanto, utilice este producto a razón de 1.5 a 3 pintas por acre en el caso de malezas anuales, 3 a 7.5 pintas por acre en el caso de malezas perennes y 3 a 7.5 pintas por acre en el caso de matorrales leñosos y árboles. El uso de acuerdo con las indicaciones incluidas en la etiqueta del producto permitirá lograr el control total o parcial de las malezas herbáceas, los matorrales leñosos y los árboles enumerados en la sección "MALEZAS CONTROLADAS" de esta etiqueta.

Use las proporciones recomendadas de este producto con 3 a 40 galones de agua por acre para rociar de manera diseminada, a menos que se indique de otra manera en esta etiqueta. A medida que la densidad de las malezas aumenta, el volumen de rocio se debe aumentar también para conseguir una cobertura completa, pero siempre dentro de los límites recomendados. A fin de evitar un rocio muy fino, seleccione la boquilla cuidadosamente. Para obtener mejores resultados con equipo a nivel del terreno, use boquillas tipo abanico plano. Verifique el patrón de rocio para la distribución uniforme de las gotitas.

## 7.3 Equipo de mano

Aplique el producto al follaje de la vegetación que se desea controlar. En aplicaciones de rociado para mojar, la cobertura del follaje debe ser completa y uniforme. No rocie hasta el punto en que el producto gotee de la vegetación. Use rociadores gruesos solamente.

Para el control de las malezas enumeradas en la sección "Malezas anuales" de "MALEZAS CONTROLADAS", aplique una solución al 0.5 por ciento de este producto a malezas de menos de 6 pulgadas de altura o de longitud de zarcillo. Para malezas anuales de más de 6 pulgadas de altura, o a menos que se especifique lo contrario, utilice una solución al 1 por ciento. Aplique antes de que se formen las cabezas de semillas en el césped o los brotes en las malezas de hojas anchas.

Para obtener resultados óptimos, utilice una solución al 1.5 por ciento en las malezas perennes más difíciles de controlar, enredaderas leñosas, matorrales y árboles. Realice aplicaciones a las malezas perennes después de la aparición de cabezas de semillas en el césped o la formación de brotes en malezas de hojas anchas, matorrales leñosos y árboles para obtener resultados óptimos.

En el caso de aplicaciones de rociado directo de bajo volumen, utilice una solución de este producto al 4 a 8 por ciento para el control total o parcial de maleza anual, maleza perenne, arbustos leñosos o árboles. La cobertura de rociado debe ser uniforme y debe tener contacto con un 50 a 75 por ciento del follaje, como mínimo. Para obtener los mejores resultados es importante cubrir la mitad superior de la planta. Si emplea una boquilla de chorro recto, comience la aplicación del producto en la parte superior de la vegetación rocié de arriba hacia abajo con movimientos laterales de barrido. Al utilizar boquillas con salida en forma de abanico o cono, o al usar nebulizadores de control manual, nebulice el producto al follaje de la vegetación. Para asegurar una cobertura adecuada, rocie ambos lados de los árboles y los arbustos leñosos grandes o altos, si el follaje es denso o si hay varios retoños. Para obtener los mejores resultados, aplique el producto a los árboles y arbustos leñosos en crecimiento después de la expansión completa de las hojas y antes de que éstas tengan color otoñal y se caigan.

A menos que se especifique de otro modo, use las dosis recomendadas que se indican en el cuadro siguiente de "Dosis de Aplicación" para distintos métodos de aplicación foliar utilizando equipo de gran volumen, tipo mochila, y tipos similares de equipo manual. Cuando se usa de acuerdo a las instrucciones de la etiqueta, este producto proporciona el control total o parcial de las malezas herbáceas, los matorrales leñosos y los árboles que se indican en la sección "MALEZAS CONTROLADAS" de esta etiqueta.

#### Dosis de Aplicación

APLICACIÓN	AQUAMASTER HERBICIDA	VOLUMEN DE PULVERIZACIÓN GALONES POR ACRE
PULVERIZACIÓN PARA MOJAR	Pistola manual o tipo mochila	0.5 to 1.5% en peso      pulverización para mojar*
PULVERIZACIÓN DIRIGIDA DE BAJO VOLUMEN	Tipo mochila Alto volumen modificado	4 a 8% en peso 1.5 to 3% en peso      15 a 25** 40 a 60**

\*En el caso de efectuar aplicaciones de pulverización para mojar, la cobertura debe ser uniforme y total. No pulverice hasta el punto de escorrimento.

\*\*En el caso de efectuar aplicaciones de pulverización para mojar, la cobertura debe ser uniforme y total. No pulverice hasta el punto de escorrimento.

## 7.4 Equipo especializado

Este producto puede aplicarse mediante aplicadores con pantalla, rociadores con campana, aplicadores por rotación o barras de esponja, después de diluirse y mezclarse bien con agua, a la maleza especificada en esta etiqueta que crezca en sitios acuáticos o zonas que no sean de cultivo.

EVITE EL CONTACTO DEL HERBICIDA CON LA VEGETACIÓN DESEABLE YA QUE ES PROBABLE QUE SUFRA GRAVES DAÑOS O SEA DESTRUIDA TOTALMENTE.

Los aplicadores utilizados por encima de la vegetación deseable deben ser calibrados de tal manera que el rociado o el punto de contacto más bajo esté por lo menos a 2 pulgadas arriba de la vegetación deseable. Gotas, niebla, espuma o salpicaduras del herbicida en contacto con la vegetación deseable pueden causar con mucha probabilidad descoloración, atrofia o destrucción.

Se obtienen mejores resultados cuando una mayor cantidad de la maleza entra en contacto con el herbicida. Las malezas que no entran en contacto con la solución herbicida no serán afectadas. Esto puede ocurrir en lugares donde las malezas están muy concentradas, cuando la infestación es grave o donde la altura de las malezas es variada, lo que no permite que todas sean tocadas por el herbicida. En estos casos puede hacerse necesario repetir el tratamiento.

#### Aplicadores con pantalla y con capucha

Los rociadores con pantalla o con capucha aplican la solución del herbicida directamente sobre las malezas, al mismo tiempo que protegen la vegetación deseable, para que no sea tocada por el herbicida. Use boquillas que aseguren un recubrimiento uniforme en toda el área tratada. En los rociadores con pantalla, mantenga las pantallas debidamente colocadas a fin de proteger la vegetación que no se desee destruir. SE DEBE TENER MUCHO CUIDADO PARA EVITAR EL CONTACTO DEL HERBICIDA CON LA VEGETACIÓN DESEABLE.

#### **Aplicadores por frotación y barras de esponja**

Los aplicadores por frotación son dispositivos que aplican cantidades adecuadas de este producto directamente sobre la maleza.

El equipo debe ser diseñado, mantenido y operado de manera que la solución del herbicida no haga contacto con la vegetación deseable. Opere este equipo a velocidades inferiores a las 5 millas por hora. En áreas donde la infestación es grave, se puede mejorar la eficacia reduciendo la velocidad, así se asegura que el frotador esté siempre adecuadamente saturado con la solución del herbicida. Se obtienen mejores resultados si se aplica dos veces en direcciones opuestas.

Evite fugas o goteos sobre la vegetación deseable. Ajuste la altura de los aplicadores a fin de asegurar un contacto adecuado con las malezas. Mantenga limpias las superficies de frotación. Tenga presente que en terrenos inclinados, el herbicida puede migrar causando goteos en la parte baja y el secado de las mechas en la parte superior del aplicador por frotación.

No use aplicadores por frotación cuando las malezas estén mojadas.

Mezcle solamente la cantidad de solución que se usará durante el período de un día, debido a que el uso de sobras de días anteriores puede dar como resultado un efecto menos eficiente. Inmediatamente después de usar este producto, lave bien el aplicador usando bastante agua.

En todas las aplicaciones con enjugador se recomienda utilizar un surfactante no iónico en proporción del 10 por ciento por volumen de solución total de herbicida.

**Para aplicadores de cordón o de mecha de esponja**—Puede emplearse soluciones que oscilan entre 33 y 75 por ciento de este producto en agua.

**Aplicadores de panel**—En los aplicadores de enjugador de panel pueden utilizarse soluciones de un 33 a un 100 por ciento de producto en agua.

## **8.0 INSTRUCCIONES SEGUN AREAS Y USO**

Salvo que se especifique lo contrario, pueden efectuarse aplicaciones para controlar cualquier tipo de maleza que se indique en las "Malezas anuales", "Malezas perennes" o "Matorrales leñosos y árboles" mesas de tasa. Consulte también la sección "Equipo especializado".

### **8.1 Sitios acuáticos**

Este producto puede aplicarse a las malezas brotadas en todo tipo de masa de agua (dulce o salobre), circulante o no. Esto incluye lagos, ríos, arroyos, estanques, estuarios, diques, manantiales, zanjas de drenaje e irrigación, canales, represas, plantas de tratamiento de aguas y sitios donde desea restaurarse el hábitat de la fauna local.

Este producto también puede usarse para controlar la maleza, arbustos leñosos y árboles indicados en la etiqueta que crezcan en zonas terrestres que no sean de cultivo o en áreas acuáticas de estas zonas.

Si hubiera sitios acuáticos próximos a las zonas no utilizadas para cultivo y que fueran parte del tratamiento a realizarse, lea y cumpla con las siguientes instrucciones:

**Este producto no controla plantas que estén completamente sumergidas o que tengan la mayor parte de su follaje bajo agua.**

No hay restricciones de ningún tipo en cuanto a la utilización del agua tratada en irrigación, actividades recreativas o uso doméstico.

Antes de aplicar este producto en aguas de uso público, consulte a los organismos estatales locales reguladores de caza y pesca, así como a las autoridades que controlan el uso del agua. Tal vez sea necesario contar con un permiso para tratar tales aguas.

**NOTA:** No aplique este producto **directamente al agua** dentro de 0.5 milla en contra de la corriente de una fuente activa de agua potable en agua que fluya (es decir, río, corriente, etc.) o dentro de la 0.5 milla de una fuente activa de agua potable en una extensión de agua estancada, tal como un lago, estanque o represa. Para poder efectuar aplicaciones sobre agua próxima o dentro de un radio de media milla de una toma activa de agua potable, la toma de agua deberá desactivarse durante un mínimo de 48 horas luego de la aplicación. La toma de agua puede abrirse antes de las 48 horas si el nivel de glifosato en la misma se encuentra por debajo de 0.7 partes por millón, determinado por un análisis de laboratorio. Estas aplicaciones sobre agua podrán efectuarse **ÚNICAMENTE** en caso de que exista una fuente de agua alternativa o lagunas de contención que permitan la desactivación temporal de la toma de agua durante un mínimo de 48 horas luego de la aplicación. Esta restricción **NO** se aplica al sobreociado inadvertido intermitente de agua en sitios de uso terrestre.

Para tratamientos luego de un descenso del nivel de las aguas o en zanjas secas, después del tratamiento deje transcurrir 7 días o más antes de volver a llenar con agua. Así logrará el máximo control de las malezas. Aplique el herbicida de AquaMaster dentro de las 24 horas siguientes al descenso de las aguas, para asegurarse de que el producto está actuando sobre malezas en crecimiento activo.

Tal vez sea necesario volver a tratar la vegetación flotante. Evite que la vegetación a la que se le aplicó el producto, lo pierda por salpicaduras creadas por el bote utilizado para la aplicación o por otros botes que circulen en los alrededores. No efectúe ningún tratamiento si se esperan lluvias dentro de las 6 primeras horas posteriores a la aplicación. No vuelva a aplicar dentro de las 24 horas posteriores al tratamiento inicial.

La aplicación efectuada en las masas de agua en circulación debe realizarse desplazándose corriente arriba, para evitar que el herbicida se concentre en el agua. Cuando se lleve a cabo alguna aplicación en las orillas de un río o arroyo, no superponga las aplicaciones a más de 1 pie en el cauce del río o arroyo. No aplique sobre masas

de agua donde no haya maleza. No supere la concentración máxima aplicable (7.5 pinta/acre) en ninguna aplicación diseminada que se efectúe sobre agua excepto en los siguientes casos, en los que puede aplicarse la concentración indicada en la etiqueta:

- Cruces con arroyos en derechos de paso.
- En los casos en que las aplicaciones den como resultado menos del 20 por ciento de la superficie total de agua tratada.

Cuando haya que tratar toda la superficie de una masa de agua no circulante, el tratamiento de ésta en franjas podría evitar el consumo total del oxígeno debido al proceso de degradación de la vegetación. Este agotamiento del oxígeno podría provocar la muerte de peces.

#### **Mezclas Para Tanque**

Pueden usarse mezclas para tanque de este producto con 2,4-D amina para aumentar el espectro de vegetación controlada en zonas acuáticas. Utilice de 1.5 a 2 pinta de este producto más 1 a 2 cuartos de galón de 2,4-D amina (4 libras de ingrediente activo por galón, rotulado para sitios acuáticos) para controlar maleza anual. Utilice de 3 a 7.5 pinta de este producto más 2 a 4 cuartos de galón de 2,4-D amina (4 libras de ingrediente activo por galón, rotulado para sitios acuáticos) para el control total o parcial de maleza perenne, arbustos leñosos y árboles.

Al mezclar en tanque, lea y siga al pie de la letra las reclamaciones, advertencias y demás información en las etiquetas de los productos utilizados. Use la mezcla conforme a las medidas precautorias más estrictas indicadas para cada producto en la mezcla. Mezcle en el siguiente orden: Llene el tanque de rociado a la mitad con agua, agregue el herbicida AquaMaster, luego 2,4-D amina y por último el surfactante. Llene el tanque de rociado con agua.

**NOTA: NO MEZCLE EL HERBICIDA AQUAMASTER CON CONCENTRADOS DE 2,4-D AMINA SIN PORTADOR DE AGUA. NO MEZCLE EL HERBICIDA AQUAMASTER CON 2,4-D AMINA EN EQUIPO ROCIADOR CON INYECTOR DE DERIVACIÓN.**

#### **Para el control del esparrillo (*Spartina spp.*)**

La presencia de residuos y sedimento sobre la superficie de las plantas de esparrillo reduce el rendimiento del producto. Puede ser necesario lavar las plantas que se desean tratar antes de aplicar el herbicida para mejorar su absorción. En los casos en que el esparrillo se haya cortado o podado antes de la aplicación, deje que vuelva a crecer bastante antes de aplicar el producto para asegurar la intercepción y la absorción adecuadas de la solución herbicida. La lluvia dentro de las 2 horas o la inmersión dentro de las 4 horas de la aplicación pueden reducir la eficacia.

Antes de aplicar, examine las áreas que desea tratar para determinar si existen lechos de crustáceos dentro del área de tratamiento. Espere a que se hayan recolectado los crustáceos antes de realizar la aplicación o absténgase de recolectar los crustáceos durante 14 días después del tratamiento.

Agregue 1 ó 2 cuartos de galón o más de surfactante no iónico u otro coadyuvante aprobado para su uso en sitios acuáticos compatible con este producto por cada 100 galones de solución para rociar en el caso de aplicaciones al voleo (por tierra o por aire) y cuando se utilicen equipos de aplicación de detección óptica.

No aplique este producto a través de ningún tipo de sistema de irrigación.

**APLICACIÓN:** En condiciones de aplicación ideales, es decir, en los casos en que no hay presentes sedimentos y residuos sobre las superficies de las plantas y puede lograrse una buena cobertura del rocio, cuando las plantas que se desean tratar están creciendo de forma activa y cuando se utilizan las concentraciones y los volúmenes de aplicación indicados en la etiqueta, deje secar como mínimo 4 horas antes de que las plantas queden cubiertas por la marea. En los casos en que no se cumplen una o varias de estas condiciones, programe las aplicaciones de forma tal de dejar secar al menos 5 horas antes de que las plantas queden cubiertas por la marea. No aplicar cuando la velocidad del viento en el lugar de aplicación es de más de 10 millas por hora.

**Aplicación al voleo (por tierra):** Aplique de 2 a 8 cuartos de galón de este herbicida en 5 a 100 galones de solución para rociar por acre. Para obtener resultados óptimos, es necesario cubrir completamente los grupos de plantas de esparrilla.

**Aplicación al voleo (equipos de aplicación de detección óptica/tierra):** Aplique de 2 a 8 cuartos de galón de este producto en 5 a 100 galones de solución para rociar por acre usando equipos diseñados y calibrados para aplicar solución para rociar sólo cuando hay presentes plantas de esparrilla y éstas son detectadas por sensores ópticos. Para obtener resultados óptimos, es necesario cubrir completamente los grupos de plantas de esparrilla.

**Equipos de mochila o de alto volumen manuales:** Aplique de 5 a 8 por ciento de solución de este producto. Asegúrese de lograr la cobertura completa de los grupos de plantas de esparrilla. No rocíe hasta el punto del escurrimiento.

**Aplicación al voleo (por aire):** Aplique de 2 a 8 cuartos de galón de este producto en 5 a 10 galones de solución para rociar por acre. Mantenga como mínimo un tampon de 50 pies entre los lechos de crustáceos comerciales y las áreas tratadas. El potencial de arrastre del rocio depende de factores climáticos y factores relacionados con los equipos. El aplicador debe estar familiarizado con los patrones de vientos locales y monitorear y registrar la temperatura y la velocidad del viento antes y periódicamente durante la aplicación. Programe la aplicación para que dure como mínimo 5 horas antes de que las plantas tratadas queden cubiertas por la marea.

#### **Para el control de la salvinia gigante**

Para el control de la salvinia gigante, este producto puede aplicarse como una solución de rocio para mojar el 2.0% v/v con 0.5 a 2.0% v/v de un surfactante no iónico que contenga como mínimo un 70 por ciento de ingrediente activo. Asegúrese de realizar una

cobertura completa cuando utilice tratamientos de rocío para mojar empleando equipos manuales.

Para aplicaciones al voleo, aplique de 3 a 3.75 cuartos de galón de este producto con un sistema de surfactante aprobado acuático que contenga 0.1% v/v de organosilicona no iónica y 0.25% v/v surfactante adherente penetrante no iónico en 3 a 40 galones por acre como tratamiento al voleo.

Deje pasar como mínimo 3 días después de la aplicación antes de alterar la vegetación tratada. Este producto no controla las plantas que están totalmente sumergidas o que tienen la mayor parte de su follaje debajo del agua.

## 8.2 Inyección en tallos huecos

Este producto puede aplicarse con dispositivos de inyección manuales para administrar las cantidades etiquetadas de este producto a las plantas con tallo hueco identificadas que crecen en cualquier sitio acuático o de los lugares no cultivados especificados en esta etiqueta. Para controlar las siguientes plantas con tallo hueco, siga las instrucciones de uso indicadas abajo:

### Semilla de ricino (*Ricinus communis*)

Inyecte 4 mL por planta de este producto en la parte inferior del tallo principal.

### Cicuta (*Conium maculatum*)

Inyecte una caña de una hoja por planta a 25-30 cm (10-12 pulgadas) por encima de la corona de la raíz con 5 mL de una solución al 5% v/v de este producto.

### Hogweed gigante (*Heracleum mantegazzianum*)

Inyecte una caña de una hoja por planta a 30 cm (12 pulgadas) por encima de la corona de la raíz con 5 mL de una solución al 5% v/v de este producto.

### Equiseto o cola de caballo (*Equisetum arvense*)

Inyecte un segmento por encima de la corona de la raíz con 0.5 mL de este producto por tallo. Utilice una jeringa pequeña, con capacidad para medir esta cantidad.

### Lirio amarillo (*Iris pseudocorus*)

Corte los tallos de las flores con un par de pinzas 8 a 9 pulgadas sobre la corona de la raíz. Empuje una aguja cóncava en el centro del tallo y luego retírela lentamente a medida que se inyectan 0.5 mL por tallo de este producto en el tallo.

### Polygono bohemio (*Polygonum bohemicum*),

### Centidonia gigante (*Polygonum sachalinense*), y

### Polygono japonés (*Polygonum cuspidatum*)

Inyecte 5 mL de este producto por tallo, entre el segundo y el tercer nodo.

### Caña brava (*Arundo donax*)

Inyecte 6 mL por tallo de este producto entre el segundo y el tercer entrenudo.

### Cardo de Canadá (*Cirsium arvense*)

Use una tijera de podar para cortar un manojo de 8 a 9 de las plantas más altas en la etapa de brotación. Utilice una aguja de cavidad que se introduce en el centro del tallo y luego se extrae lentamente a medida que inyecta 0.5 mL de este producto en cada tallo.

**NOTA:** Según la tasa de uso anual máxima de glifosato para estos sitios no cultivados, el total combinado para todos los tratamientos no debe exceder 8 cuartos de galón de este producto por acre. A razón de 5 mL por tallo, 8 cuartos de galón deberían servir para tratar aproximadamente 1500 tallos.

## 8.3 Troncos cortados

El tratamiento de troncos cortados puede hacerse en cualquier área indicada en esta etiqueta. Este producto controla muchas especies de matorrales leñosos y árboles. Aplique este producto usando equipo adecuado para garantizar la cobertura completa del cámibum. Corte los árboles o sus brotes cerca de la superficie de la tierra. Aplique una solución de este producto del 50 al 100 por ciento a la superficie recién cortada, **inmediatamente después** del corte. Demorar la aplicación puede reducir la eficacia del producto. Para obtener mejores resultados, la aplicación deberá hacerse durante los períodos de crecimiento activo y expansión completa de las hojas.

Para controlar *Ailanthus altissima* (Tree-of-heaven) efectúe un tratamiento de tocón cortado de acuerdo con las instrucciones en esta sección utilizando una mezcla de rociado con 50 por ciento de herbicida AquaMaster y 10 por ciento de Arsenal.

**NO HAGA LAS APPLICACIONES SOBRE TRONCOS CORTADOS CUANDO LAS RAÍCES DE LOS MATORRALES LEÑOSOS O ÁRBOLES DESEABLES PUEDEN ESTAR INVERTIDAS A LAS RAÍCES DE LOS TRONCOS CORTADOS.** Algunos brotes, tallos o árboles pueden compartir el mismo sistema radicular. Árboles que están contiguos, que tienen la misma edad, altura y separación pueden indicar raíces compartidas. Cuando se trata a uno o más árboles que tienen raíces en común, tanto si están invertidos como si comparten el sistema radicular, es probable que se produzca un daño en los brotes/árboles no tratados.

## 8.4 Areas generales no cultivables y áreas industriales

Utilice en lugares como aeropuertos, complejos de apartamentos, zonas comerciales, bordes de acequias, entradas de autos, zanjas secas, canales secos, hileras de cercas, áreas de forestación, canchas de golf, invernaderos, zonas industriales, depósitos de

maderas, zonas de fabricación, solares municipales, zonas naturales, complejos de oficinas, cultivos ornamentales, estacionamientos, parques, pasturas, zonas con tanques de petróleo e instalaciones de bombeo, líneas de ferrocarril, praderas, zonas recreativas, zonas residenciales, derechos de paso, bordes de carreteras, escuelas, granjas de tepes o para semillas de césped, complejos deportivos, zonas de almacenamiento, subestaciones, zonas de servicios públicos, zonas de depósito, otros lugares públicos y zonas en las que se realiza gestión de vida silvestre.

### Control general de malezas, recortado de bordes y suelo limpio de malezas

Este producto puede usarse en áreas generales no cultivables. Puede aplicarse con cualquiera de los equipos descritos en este libreto. Puede usarse para el recortado de bordes alrededor de objetos en áreas no cultivables, para tratamiento localizado de vegetación no deseable y para eliminar las malezas no deseables que crecen en cuadros de arbustos establecidos y plantaciones ornamentales. Este producto puede usarse antes de plantar un área con plantas ornamentales, flores, césped (tepes o semillas), o antes de colocar asfalto o de comenzar un proyecto de construcción.

Pueden hacerse aplicaciones repetidas de este producto, a medida que emergen las malezas, para mantener el suelo limpio de malezas.

**MEZCLAS PARA TANQUE:** Este producto se puede mezclar en tanque con los siguientes productos. Consulte los rótulos de estos productos para informarse sobre áreas no cultivables y dosis de aplicación. Lea y siga con cuidado las declaraciones preventivas y toda la demás información incluida en las etiquetas de los herbicidas utilizados. Utilizar conforme a las declaraciones preventivas más restrictivas correspondientes a cada producto de la mezcla.

Arsenal	Outrider®
Barricade 65WG	Pendulum 3.3 EC
Certainty®	Pendulum WDG
diuron*	Plateau
Endurance	Principe DF
Escort XP	Principe Liquid
Garlon 3A	Ronstar 50 WP
Garlon 4	Sahara
Hyvar X	simazine*
Karmex	Surlan
Krovar I DF	Telar
Oust XP	2,4-D*

\*El usuario es responsable de asegurarse de que puedan realizarse las mezclas en tanque con productos que contengan este ingrediente activo genérico siempre y cuando el producto específico esté registrado para dicho uso.

Este producto más las mezclas en tanque de dicamba, no se pueden aplicar por pulverización aérea en California.

### Mezclas en tanque para el control de matorrales

**MEZCLAS PARA TANQUE:** Las mezclas en tanque de este producto se pueden usar para aumentar el espectro de control de las malezas herbáceas, matorrales leñosos y árboles. Cuando lleve a cabo una mezcla en tanque, lea y cumpla cuidadosamente con todas las recomendaciones y las precauciones que establece la etiqueta, así como también con toda la información incluida en las etiquetas de todos los productos que utilice. Use cada uno de los productos para la mezcla con la mayor de las precauciones. En una mezcla en tanque se puede usar cualquiera de las dosis recomendadas de este producto.

Para el control de malezas herbáceas, emplee las dosis más bajas para mezcla en tanque. Para el control de herbaje tupido o de matorrales leñosos y árboles difíciles de controlar, emplee las dosis más altas.

**NOTA:** En tratamientos de corte lateral, se recomienda que este producto se use solo o en mezcla en tanque con Garlon 4.

### PRODUCT

Arsenal
Escort XP
Garlon 3A*
Garlon 4

\*Asegúrese de que Garlon 3A se mezcle bien con agua de acuerdo a las instrucciones de la etiqueta, antes de agregar este producto. Para evitar problemas de compatibilidad, agite la mezcla de pulverización en el momento en que se agregue este producto.

## 8.5 Manejo de hábitats

### Restauración y mantenimiento de hábitats

Este producto puede ser usado para controlar la vegetación exótica y otras plantas indeseables en áreas de manejo de hábitats y en áreas naturales, incluyendo áreas ribereñas y estuarinas, hábitats nativos y refugios para la fauna silvestre. Pueden hacerse aplicaciones para permitir la recuperación de las especies de plantas nativas, antes de plantar dichas especies nativas deseables, y para otros requisitos similares de control de la vegetación de amplia efectividad. A fin de eliminar selectivamente ciertas plantas indeseables, se pueden hacer aplicaciones localizadas para controlar y mejorar el hábitat.

### Sitios donde se siembran alimentos para la fauna silvestre

Este producto puede ser usado para preparar el terreno donde se desea sembrar alimentos para la fauna silvestre. Cualquier especie de alimento para la fauna silvestre puede ser sembrada después de aplicar este producto, o también se puede permitir que las especies nativas vuelvan a poblar el área. Si hace falta labrar para preparar el terreno

semillas, espere 7 días después de aplicar este producto antes de arar a fin de permitir la absorción adecuada en las partes de la planta que estén bajo tierra.

## 8.6 Inyección y chorro (matorrales leñosos y árboles)

Los matorrales leñosos y árboles pueden ser controlados aplicando este producto por inyección o chorro. Aplique este producto usando equipo adecuado, que debe ser capaz de penetrar en el tejido vivo. Aplique 1 mL de este producto por cada 2 ó 3 pulgadas de diámetro del tronco a la altura del pecho (DBH en inglés). La mejor forma de hacerlo es aplicando una solución del 50 al 100 por ciento, este producto, con un chorro continuo alrededor del árbol o en cortes espaciados uniformemente alrededor del árbol y por debajo del nivel de las ramas. A medida que el diámetro del árbol aumenta, se obtienen mejores resultados con el chorro diluido continuo alrededor del árbol o en cortes espaciados muy cerca entre sí alrededor del árbol. Evite las aplicaciones que permiten el desague de material cuando se chorrean alrededor del árbol o sobre los cortes en árboles que tienen la facilidad de exudar savia de los cortes. En especies de este tipo, haga los cortes de manera oblicua a fin de producir el efecto de copa y use el producto sin diluir. Para obtener mejores resultados, la aplicación debe tener lugar durante períodos de crecimiento activo y expansión completa de las hojas.

## 8.7 Carreteras

Todas las instrucciones de la sección "Áreas Generales No Cultivables y Áreas Industriales" son válidas para las carreteras.

### Tratamiento de bordes

Este producto puede ser usado en los bordes de las carreteras. Puede aplicarse con rociadores de agujón, rociadores de agujón con pantalla, boquillas descentradas de gran volumen, equipo de mano y equipos similares.

### Barandas y otros obstáculos para la siega

Este producto puede ser usado para controlar las malezas que crecen debajo de las barandas y alrededor de los postes de señal y otros objetos en los bordes de las carreteras.

### Tratamiento localizado

Este producto puede ser usado como tratamiento localizado para controlar la vegetación indeseable que crece a lo largo de los bordes de las carreteras.

**MEZCLAS PARA TANQUE:** Este producto puede mezclarse en tanque con los siguientes productos para tratamientos de bordes de carreteras, vallas de seguridad, zonas específicas y áreas sin vegetación, siempre y cuando el producto específico para la mezcla en tanque esté rotulado para el tipo de área. Consulte las etiquetas de estos productos para ver los sitios no cultivados y las dosis de aplicación aprobados. Lea y siga con cuidado las declaraciones preventivas y toda la demás información incluida en las etiquetas de los herbicidas utilizados. Utilizar conforme a las declaraciones preventivas más restrictivas correspondientes a cada producto de la mezcla.

atrazine*	Landmark MP	Sahara DG
Crossbow L	Landmark XP	simazine*
dicamba*	Oust XP	Surflan AS
diuron*	Outrider	Surflan WDG
Endurance	pendimethalin*	Telar DF
Escort XP	Plateau	Velpar DF
Gallery 75 DF	Plateau DG	Velpar L
Krovar I DF	Poast	2,4-D*
Landmark II MP	Ronstar 50 WSP	

\*El usuario es responsable de asegurarse de que puedan realizarse las mezclas en tanque con productos que contengan este ingrediente activo genérico siempre y cuando el producto específico esté registrado para dicho uso.

Vea las instrucciones generales para mezclas de tanque en la sección "MEZCLA" de este libro.

### Mantenimiento del Bermudagrass y Bahiagrass

#### Aplicaciones cuando estén latentes (dormientes)

Este producto puede usarse para controlar o controlar parcialmente muchas malezas anuales de invierno y tall fescue para el alivio eficaz de bermudagrass y bahiagrass latentes. Trate solamente cuando el césped esté latente y antes de su reverdecer primaveral. Este producto también se puede mezclar en tanque con el herbicida Outrider o Oust XP para el control residual. Las mezclas de tanque de este producto con Oust XP pueden retrazar el reverdecer.

Para obtener mejores resultados con malezas anuales de invierno, haga el tratamiento cuando las plantas estén en una etapa temprana de su crecimiento (menos de 6 pulgadas de altura) después de que la mayoría haya germinado. Para obtener mejores resultados con tall fescue, haga el tratamiento cuando el fescue esté en o después de su etapa de 4 a 6 hojas.

Aplique de 6 a 48 onzas fluidas de este producto en una mezcla de tanque con 0.75 a 1.33 de onzas de herbicida Outrider por acre. Lea y siga todas las instrucciones de la etiqueta del herbicida Outrider.

**MEZCLAS PARA TANQUE:** Aplique de 6 a 48 onzas fluidas de este producto por acre, solo o en mezcla de tanque con 0.25 a 1 onza de Oust XP por acre. Aplicar las proporciones indicadas en la etiqueta en 10 a 40 galones de agua por acre. Uselo solamente en áreas donde el bermudagrass o bahiagrass son deseables y en las que puede tolerarse un

poco de daño o decoloración. Para evitar que el reverdecer se retrasa y para minimizar el daño, no agregue más de 1 onza de Oust XP por acre sobre bermudagrass y no más de 0.5 onzas de Oust XP por acre sobre bahiagrass, y evite el tratamiento cuando estas hierbas se encuentren en estado semi-latente.

### Bermudagrass que está creciendo activamente

Este producto puede ser usado para controlar total o parcialmente muchas malezas anuales y perennes para el mantenimiento eficaz de bermudagrass que está creciendo activamente. Aplique de 12 a 36 onzas fluidas de este producto en 10 a 40 galones de solución para rociar por acre. Para tratar malezas anuales que tengan menos de 6 pulgadas de altura (o el largo de los tallos), use las proporciones más bajas. Use la proporción más alta a medida que las malezas aumenten de tamaño o cuando estén cerca de la floración o de la formación de semillas. Estas proporciones también controlan parcialmente las siguientes especies perennes:

Bahiagrass	Johnsongrass
Bluestem, silver	Trumpet creeper
Fescue, tall	Vaseygrass

Este producto se puede mezclar en tanque con el herbicida Outrider para el control o el control parcial de *Sorghum halepense* (Johnsongrass) y otras malas hierbas indicadas en la etiqueta del herbicida Outrider. Use de 6 a 24 onzas fluidas de este producto con 0.75 a 1.33 onzas de herbicida Outrider. Utilice las proporciones más altas de ambos productos para el control de malas hierbas perennes o anuales que tengan una altura superior a 6 pulgadas.

**MEZCLAS PARA TANQUE:** Este producto puede ser mezclado con Oust XP. Si se mezcla en tanques, no use más de 12 a 24 onzas fluidas de este producto con 1 a 2 onzas de Oust XP por acre. Para tratar malezas anuales indicadas en este libro y en el libro de Oust XP, que tengan menos de 6 pulgadas de altura (o el largo de los tallos), use las proporciones más bajas de cada producto. Use la proporción más alta a medida que las malezas aumenten de tamaño o cuando estén cerca de la floración o de la formación de semillas. Estas proporciones también controlan parcialmente las siguientes especies perennes:

Bahiagrass	Fescue, tall
Bluestem, silver	Johnsongrass
Broomsedge	Poorjoe
Dallisgrass	Trumpet creeper
Dock, curly	Vaseygrass
Dogfennel	Vervain, blue

Uselo solamente en bermudagrass que esté bien establecido. Como resultado del tratamiento, el bermudagrass puede sufrir deterioro, pero volverá a crecer si se riega. No se recomienda repetir el tratamiento con la mezcla de tanque en la misma estación, ya que esto puede ocasionar daños graves al bermudagrass.

### Bahiagrass que está creciendo activamente

Para suprimir el crecimiento vegetativo y la inhibición de la formación de semillas de bahiagrass durante aproximadamente 45 días, aplique 4 onzas fluidas de este producto en 10 a 40 galones de agua por acre. Aplique de 1 a 2 semanas después de reverdecer completo o después de cortar a una altura uniforme de 3 a 4 pulgadas. Esta aplicación debe ser hecha antes de la emergencia de las semillas.

Para la supresión durante un máximo de 120 días, aplique 3 onzas fluidas de este producto por acre, y a continuación una aplicación de 2 a 3 onzas fluidas por acre unos 45 días más tarde. No haga más de 2 aplicaciones al año.

Este producto se puede utilizar para el control o el control parcial de *Sorghum halepense* (Johnsongrass) y otras malas hierbas indicadas en la etiqueta de Outrider, en *Paspalum notatum* (bahiagrass) en crecimiento activo. Aplique de 1.5 a 3.5 onzas fluidas de este producto con 0.75 a 1.33 onzas de herbicida Outrider por acre. Utilice las proporciones más altas para el control de malas hierbas perennes o anuales que tengan una altura superior a 6 pulgadas. Utilice sólo en *Paspalum notatum* (bahiagrass) bien establecido.

**MEZCLAS PARA TANQUE:** Puede usarse una mezcla de tanque de este producto con Oust XP. Aplique 4 onzas fluidas de este producto con 0.25 onza de Oust XP por acre, 1 a 2 semanas después de la primera siega de la primavera. Haga solamente 1 aplicación al año.

## 9.0 TIPOS DE MALEZAS CONTROLADAS

Use siempre la proporción más alta de este producto por acre, dentro de las proporciones indicadas en la etiqueta, cuando las malezas son densas o cuando crecen en un área no tocada (no cultivada).

Puede haber una disminución de los resultados cuando se traten malezas cubiertas con mucho polvo. Para las malezas que han sido segadas, pastadas o cortadas, permita que vuelvan a crecer antes del tratamiento.

Vea las secciones siguientes para las proporciones de aplicación para el control de malezas anuales y perennes, matorrales leñosos y árboles. Para las malezas, matorrales leñosos y árboles difíciles de controlar, donde las plantas crecen en condiciones de estrés, o donde la infestación es densa, pueden usarse 4.5 a 8 cuartos de galón por acre de este producto para obtener mejores resultados.

## 9.1 Malezas anuales

Aplique a las malezas anuales en crecimiento activo y de oja ancha.

Deje transcurrir al menos 3 días luego de la aplicación antes de hacer algo sobre la vegetación tratada. Despues del lapso mencionado, podrá cortar, remover o quemar la maleza. En "INFORMACIÓN GENERAL", "MEZCLA", e "EQUIPOS Y TÉCNICAS PARA LA APLICACIÓN" encontrará instrucciones específicas relativas a la aplicación.

Use 1.5 pintas por acre si las malezas tienen menos de 6 pulgadas de altura o largo de los tallos y 1 cuarto a 4 cuartos de galón por acre si las malezas tienen más de 6 pulgadas de altura o largo de los tallos o cuando las malezas crecen en condiciones de estrés.

Para aplicaciones de rociado para mojar, aplique una solución de 0.5% de este producto a las malezas que tengan menos de 6 pulgadas de altura o largo de los tallos. Haga la aplicación antes de la formación de semillas para la hierba, o la formación de yemas para las malezas de hoja ancha. Para las malezas anuales que tienen más de 6 pulgadas de altura o las malezas más pequeñas que crecen en condiciones de estrés, use una solución del 0.75- al 1.5-por ciento. Use la dosis más alta para las especies difíciles de controlar o las malezas de más de 24 pulgadas de altura.

### ESPECIES DE MALEZAS

Anoda, spurred	Mayweed
Balsamapple**	Medusahed*
Barley*	Morningglory ( <i>Ipomoea spp</i> )
Barley, little*	Mustard, blue*
Barnyardgrass*	Mustard, tansy*
Bassia, fivehook	Mustard, tumble*
Bittercress*	Mustard, wild*
Bluegrass, annual*	Nightshade, black*
Bluegrass, bulbous*	Oats
Brome, downy*	Panicum, browntop*
Brome, Japanese*	Panicum, fall*
Broomsedge	Panicum, Texas*
Buttercup*	Pennycress, field*
Castorbean	Pepperweed, Virginia*
Cheatgrass*	Pigweed*
Cheeseweed ( <i>Malva parviflora</i> )	Puncturevine
Chervil*	Purslane, common
Chickweed*	Pusley, Florida
Cocklebur*	Ragweed, common*
Copperleaf, hop hornbeam	Ragweed, giant
Copperleaf, Virginia	Rice, red
Coreopsis, plains/tickseed*	Rocket, London*
Corn*	Rocket, yellow
Crabgrass*	Rye*
Cupgrass, woolly*	Ryegrass*
Dwarf dandelion*	Sandbur, field*
Eclipta*	Sesbania, hemp
Falsedandelion*	Shattercane*
Falseflax, smallseed*	Shepherd's-purse*
Fiddleneck	Sicklepod
Filaree	Signalgrass, broadleaf*
Fleabane, annual*	Smartweed, ladysthumb*
Fleabane, hairy ( <i>Conyza bonariensis</i> )*	Smartweed, Pennsylvania*
Fleabane, rough*	Sorghum, grain (milo)*
Foxtail*	Sowthistle, annual
Foxtail, Carolina*	Spanishneedles***
Geranium, Carolina	Speedwell, corn*
Goatgrass, jointed*	Speedwell, purslane*
Goosegrass	Sprangletop*
Groundsel, common*	Spurge, annual
Henbit	Spurge, prostrate*
Horseweed/Marestail ( <i>Conyza canadensis</i> )	Spurge, spotted*
Itchgrass*	Spurry, umbrella*
Johnsongrass, seedling	Starthistle, yellow
Junglerice	Stinkgrass*
Knotweed	Sunflower*
Kochia	Teaweed/Prickly sida
Lamb's-quarters*	Thistle, Russian
Lettuce, prickly*	Velvetleaf
Mannagrass, eastern*	Wheat*
	Wild oats*
	Witchgrass

\*Cuando use equipos de aplicación diseminada a nivel del terreno (aplicaciones aéreas o rociadores de agujón con boquillas tipo abanico plano), estas especies serán controladas o controladas parcialmente con 12 onzas fluidas de este producto por acre. Las aplicaciones deben hacerse usando de 3 a 10 galones de volumen por acre. Use boquillas que garanticen una cobertura completa del follaje y haga el tratamiento cuando las malezas estén en su etapa temprana de crecimiento.

\*\*Aplique únicamente con equipo de mano.

\*\*\*Aplique 3 pintas de herbicida de AquaMaster por acre.

## 9.2 Malezas perennes

Los mejores resultados se obtienen cuando las malezas perennes son tratadas una vez que han alcanzado la etapa reproductiva de su crecimiento (inicio de las semillas para hierbas y formación de yemas para malezas de hoja ancha). Para las plantas sin flores, los mejores resultados se obtienen cuando las plantas alcanzan el estado de madurez. En muchos casos, se requiere el tratamiento antes de estas etapas del crecimiento. En estos casos, use la proporción más alta dentro de las proporciones recomendadas.

Asegúrese de que la cobertura sea a fondo cuando emplee tratamientos de rociado para mojar con equipo de mano. Cuando se utilice equipo manual para tratamientos puntuales localizados de bajo volumen, aplique una solución de 4- a 8-por ciento de este producto.

Espera 7 días o más después de la aplicación antes de labrar. Si la maleza ha sido podada o labrada, no aplique el tratamiento hasta que la maleza haya crecido a la etapa recomendada. Los tratamientos otoñales deben aplicarse antes de las heladas.

Para controlar malezas que surjan de semillas o partes bajo tierra, deberá repetirse el tratamiento.

ESPECIES DE MALEZAS	PROPORCIÓN (cuartos por acre)	% DE SOLUCIÓN DE MANO
Alfalfa*	0.7	1.5
Alligatorweed*	3.0	1.3
Anise (fennel)	1.5 - 3.0	1.0 - 1.5
Bahiagrass	2.3 - 3.75	1.5
Beachgrass, European ( <i>Ammophila arenaria</i> )	-	3.5
Bentgrass*	1.0	1.5
Bermudagrass	4.0	1.5
Bermudagrass, water (knotgrass)	1.0	1.5
Bindweed, field	3.0 - 3.75	1.5
Bluegrass, Kentucky	1.5 - 2.3	0.75
Blueweed, Texas	3.0 - 3.75	1.5
Brackenfern	2.3 - 3.0	0.75 - 1.0
Bromegrass, smooth	1.5 - 2.3	0.75
Bursage, woolly-leaf	-	1.5
Canarygrass, reed	1.5 - 2.3	0.75
Cattail	2.3 - 3.75	0.75
Clover; red, white	2.3 - 3.75	1.5
Cogongrass	2.3 - 3.75	1.5
Cordgrass	2.3 - 3.75	1.0 - 2.0
Cutgrass, giant	3.0	1.0
Dallisgrass	2.3 - 3.75	1.5
Dandelion	2.3 - 3.75	1.5
Dock, curly	2.3 - 3.75	1.5
Dogbane, hemp	3.0	1.5
Fescue (except tall)	2.3 - 3.75	1.5
Fescue, tall	2.3	1.0
Guineagrass	2.3	0.75
Hemlock, poison	1.5 - 3.0	0.75 - 1.5
Horsenettle	2.3 - 3.75	1.5
Horseradish	3.0	1.5
Iceplant	1.5	1.5
Ivy; German, cape	1.5 - 3.0	0.75 - 1.5
Jerusalem artichoke	2.3 - 3.75	1.5
Johnsongrass	1.5 - 2.3	0.75
Kikuyugrass	1.5 - 2.3	0.75
Knapweed	3.0	1.5
Lantana	-	0.75 - 1.0
Lespedeza	2.3 - 3.75	1.5
Loosestrife, purple	2.0	1.0 - 1.5
Lotus, American	2.0	0.75
Maidencane	3.0	0.75
Milkweed, common	2.3	1.5
Muhly, wirestem	1.5 - 2.3	0.75
Mullein, common	2.3 - 3.75	1.5
Napiergrass	2.3 - 3.75	1.5
Nightshade, silverleaf	3.0 - 3.75	1.5
Nutsedge; purple, yellow	2.3	0.75
Orchardgrass	1.5 - 2.3	0.75
Pampasgrass	2.3 - 3.75	1.5
Paragrass	3.0	0.75
Pepperweed, perennial	3.0	1.5
Phragmites*	2.0 - 3.75	0.75 - 1.5
Quackgrass	1.5 - 2.3	0.75
Redvine*	1.5	1.5
Reed, giant ( <i>Arundo donax</i> )	3.0 - 3.75	1.5
Ryegrass, perennial	1.5 - 2.3	0.75
Salvinia, giant	3.0 - 3.75	2.0
Smartweed, swamp	2.3 - 3.75	1.5

ESPECIES DE MALEZAS	PROPORCIÓN (cuartos por acre)	% DE SOLUCIÓN DE MANO
Spatterdock	3.0	0.75
Spurge, leafy*	—	1.5
Starthistle, yellow	—	1.5
Sweet potato, wild*	—	1.5
Thistle, artichoke	1.5 – 2.3	2.0
Thistle, Canada	1.5 – 2.3	1.5
Timothy	1.5 – 2.3	1.5
Torpedograss*	3.0 – 3.75	0.75 – 1.5
Trumpetcreeper*	1.5 – 2.3	1.5
Tules, common	—	1.5
Vaseygrass	2.3 – 3.75	1.5
Velvetgrass	2.3 – 3.75	1.5
Waterhyacinth	2.5 – 3.0	0.75 – 1.0
Waterlettuce	—	0.75 – 1.0
Waterprimrose	—	0.75
Wheatgrass, western	1.5 – 2.3	0.75

\*Control parcial

**Alligatorweed (Alternantera)**—Aplique 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.3% con equipo de mano para lograr el control parcial de alligatorweed. Aplique cuando la mayoría de las plantas esté en floración. Para mantener el control, deberá repetir la aplicación.

**Beachgrass, European; Barrón o grama del norte (Ammophila arenaria)**—Aplique una solución de este producto al 8 por ciento más un 0.5 a 1.5 por ciento de surfactante no iónico para rociado o aplicación mojada de bajo volumen. Se obtienen los mejores resultados al efectuar la aplicación cuando el barrón está saliendo de la bota para alcanzar las etapas de desarrollo completo. En el otoño, aplique el producto antes de que el número de hojas verdes se reduzca a menos del 50 por ciento. No aplique el tratamiento cuando la maleza está afectada por sequía. Tal vez sea necesario repetir las aplicaciones.

**Bermudagrass**—Aplique 4 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando aparezca la vaina de las semillas.

**Bindweed, field / Silverleaf Nightshade (Hierba mora) / Texas Blueweed**—Aplique 3 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada al oeste del Río Mississippi y 2.3 a 3 cuartos por acre al este de dicho río. Cuando utilice equipo de mano, use una solución al 1.5%. Aplique cuando las plantas estén en pleno crecimiento y estén floreciendo o ya hayan florecido. Para silverleaf nightshade, los mejores resultados se obtienen cuando la aplicación se realiza luego de formadas las bayas. No aplique cuando la maleza esté debilitada por sequía. El desarrollo de nuevas hojas indica que hay un crecimiento activo. Los mejores resultados se obtienen cuando se aplica a fines del verano o durante el otoño.

**Brackenfern**—Aplique 2.3 a 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1% con equipo de mano. Aplique a las frondas crecidas que tengan al menos 18 pulgadas (45 cm) de longitud.

**Cattail (Tifa)**—Aplique 2.3 a 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando estén floreciendo o ya hayan florecido. Los mejores resultados se obtienen cuando se aplica en el verano o durante el otoño.

**Cogongrass (Zacate Fuego)**—Aplique 2.3 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada. Aplique cuando el cogongrass tengan al menos 18 pulgadas (45 cm) altura y esté en pleno crecimiento a fines del verano o durante el otoño. Luego de la aplicación y antes de remover o cortar las plantas, deje transcurrir 7 días o más. Debido a las distintas etapas de crecimiento y a lo tupido de la vegetación, que impide realizar una cobertura homogénea, para mantener el control podría ser necesario efectuar repetidas aplicaciones.

**Cordgrass (Espinata)**—Aplique 2.3 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1-2% con equipo de mano. Programe la aplicación de modo de que transcurran al menos 6 horas desde la aplicación hasta que las plantas tratadas sean cubiertas por la marea. La presencia de escombro u otros restos sobre las plantas reducirá la efectividad del producto aplicado. Para mejorar la absorción del herbicida sobre las plantas, podría ser necesario lavar éstas antes de proceder a la aplicación.

**Cutgrass, giant**—Aplique 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1% con equipo de mano para lograr el control parcial de cutgrass. Para mantener el control, deberá repetirse la aplicación, sobre todo en sitios donde la vegetación esté parcialmente sumergida en agua. Antes de repetir la aplicación, deje que las plantas vuelvan a crecer, hasta llegar a la etapa en que poseen 7 a 10 hojas.

**Dogbane, hemp / Knapweed / Horseradish**—Aplique 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando la mayoría de ellas haya llegado a la etapa de comienzo del florecimiento. Los mejores resultados se obtienen cuando se aplica a finales del verano o durante el otoño.

**Fescue, tall**—Aplique 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1% con equipo de mano. Aplique cuando las plantas

estén en pleno crecimiento y cuando la mayoría de ellas haya llegado a la etapa de floración. Cuando se aplica antes de floración, el control no resulta tan efectivo.

**Guineagrass (Zacate guinea)**—Aplique 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando la mayoría de ellas haya llegado a una etapa donde tenga al menos 7 hojas.

**Johnsongrass (Zacate Johnson) / Bluegrass, Kentucky / Bromegrass, smooth / Canarygrass, reed / Orchardgrass / Ryegrass, perennial / Timothy / Wheatgrass, western**—Aplique de herbicida de AquaMaster 1.5 a 2.3 cuartos por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando la mayoría de ellas haya llegado a la etapa del comienzo de floración. Cuando se aplica antes del comienzo de floración, el control no resulta tan efectivo. En el otoño, aplique antes de que las plantas se tornen marrones.

**Lantana**—Aplique herbicida de AquaMaster como una solución al 0.75% a 1% con equipo de mano. Aplique a la lantana en crecimiento activo durante o luego del florecimiento. Si las plantas hubieran llegado a la etapa de crecimiento leñoso, utilice la concentración más alta.

**Loosestrife, purple**—Aplique 2 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1-1.5% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando estén floreciendo o ya hayan florecido. Los mejores resultados se obtienen cuando se aplica en el verano o durante el otoño. El tratamiento en otoño debe efectuarse antes de que se produzcan heladas.

**Lotus, American (Lirio)**—Aplique 2 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando estén floreciendo o ya hayan florecido. Los mejores resultados se obtienen cuando se aplica en el verano o durante el otoño. Podría ser necesario repetir el tratamiento para controlar el crecimiento a partir de semillas o de partes enterradas de la planta.

**Maidencane / Paragrass (Pasto Pará)**—Aplique 3 cuartos e herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Podría ser necesario repetir la aplicación, sobre todo en sitios donde la vegetación esté parcialmente sumergida en agua. En estas condiciones, deje que las plantas vuelvan a crecer hasta que posean 7 a 10 hojas antes de repetir el tratamiento.

**Milkweed, common**—Aplique 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano. Aplique cuando las plantas estén en pleno crecimiento y cuando la mayoría haya llegado a la etapa de pasaje de capullo a flor.

**Nutsedge: purple, yellow (coquito, coyolito)**—Aplique 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano para controlar plantas de nutsedge existentes y los frutos inmaduros de éstas. Aplique cuando las plantas estén en flor o cuando se vean nuevos frutos en la punta de los rizomas. Los frutos que aún no hubieran germinado no serán controlados y podrían germinar luego del tratamiento. Para lograr un control a largo plazo, deberán repetir los tratamientos.

**Pampasgrass**—Aplique herbicida de AquaMaster como una solución al 1.5% con equipo de mano cuando las plantas estén en crecimiento activo.

**Phragmites**—Para controlar parcialmente phragmites en Florida y en los condados de otros estados a orillas del Golfo de México, aplique 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano. En otras áreas de los Estados Unidos, el control parcial se logra aplicando 2 a 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Los mejores resultados se obtienen cuando se aplica a finales del verano o durante el otoño, cuando las plantas están creciendo activamente y en pleno florecimiento. Dada la densidad natural de esta vegetación, que podría dificultar una cobertura uniforme del follaje, así como la existencia de plantas en distinto estado de crecimiento, podría ser necesario repetir los tratamientos para mantener el control. Los síntomas de control que se aprecian a simple vista podrían demorar en manifestarse.

**Quackgrass / Kikuyugrass / Muhly, wirestem**—Aplique 1.5 a 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano cuando la mayoría de las plantas quackgrass o wirestem muhly tengan, como mínimo, 8 pulgadas (20 cm) de altura (3 a 4 hojas) y estén creciendo activamente. Luego de la aplicación y antes de remover las plantas, deje transcurrir 3 días o más.

**Reed, giant (Carrizo) / Ice Plant**—Aplique herbicida de AquaMaster como una solución al 1.5% con equipo de mano cuando las plantas estén en pleno crecimiento. Para giant reed, los mejores resultados se obtienen cuando se aplica a fines del verano o durante el otoño.

**Salvinia gigantea**—Aplicar como una solución de rocio para mojar al 2.0% v/v con 0.5 a 2.0% v/v de surfactante no iónico que contenga al menos 70% de ingrediente activo. Para aplicaciones al voleo, aplique de 3 a 3.75 cuartos de galón de este producto con un sistema de surfactante aprobado acuático que contenga 0.1% v/v de organosilicona no iónica y 0.25% v/v surfactante adherente penetrante no iónico en 3 a 40 galones por acre como tratamiento al voleo.

**Spatterdock**—Aplique 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Aplique cuando la mayoría de las plantas estén floreciendo. Los mejores resultados se obtienen cuando se aplica en el verano o durante el otoño.

**Sweet potato, wild (boniato/batata silvestre)**—Aplique herbicida de AquaMaster como una solución al 1.5% con equipo de mano cuando las plantas estén en pleno crecimiento, durante o luego del florecimiento. Se necesitarán varias aplicaciones. Antes de repetir el tratamiento, deje que la planta llegue a la etapa de crecimiento especificado.

**Thistle (cardo): Canada, artichoke**—Aplique 1.5 a 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano para el cardo Canada. Para controlar cardo artichoke, aplique una solución al 2% de modo de mojar toda la superficie. Aplique cuando las plantas estén creciendo activamente y tengan capullos o hayan florecido.

**Torpedograss**—Aplique 3 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1.5% con equipo de mano para lograr un control parcial. Use las concentraciones menores si aplica sobre tierra y las concentraciones mayores si aplica sobre plantas parcialmente sumergidas o flotantes. Para mantener el control, deberá repetir los tratamientos.

**Tules, common**—Aplique herbicida de AquaMaster como una solución al 1.5% con equipo de mano cuando las plantas estén creciendo activamente, durante o luego de la aparición de las vainas. Despues de la aplicación, los síntomas del efecto demorarán en aparecer y tal vez no se aprecien hasta transcurridas 3 semanas o más.

**Waterhyacinth (Jacinto de agua)**—Aplique 2.5 a 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1% con equipo de mano cuando las plantas estén creciendo activamente, durante o luego de las primeras etapas del florecimiento. Despues de la aplicación, los síntomas del efecto demorarán 3 semanas o más en aparecer. La necrosis y total descomposición suele ocurrir dentro de los 60 a 90 días posteriores a la aplicación. Si desea que los efectos se aprecien más rápidamente, utilice las concentraciones más altas.

**Waterlettuce (Lechuga de agua)**—Para control, aplique herbicida de AquaMaster como una solución al 0.75-1% con equipo de mano cuando las plantas estén creciendo activamente. Use concentraciones mayores si el enmalezado fuera grave. Los mejores resultados se obtienen cuando la aplicación se realiza desde mediados de verano hasta el invierno. Si la aplicación se realizara en la primavera, tal vez deba repetirse el tratamiento.

**Waterprimrose (Clauito)**—Aplique herbicida de AquaMaster como una solución al 0.75% con equipo de mano cuando las plantas estén creciendo activamente, durante o luego de la etapa del florecimiento y antes de que ocurran los cambios de color típicos del otoño. El mejor control se logra cuando la cobertura es completa.

**Otras malezas perennes mencionadas en esta etiqueta**—Aplique 2.3 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1.5% con equipo de mano, cuando las plantas estén creciendo activamente y la mayoría haya llegado a las primeras etapas de florecimiento.

## 9.3 Matorrales leñosos y árboles

Aplique este producto después de la formación completa de hojas, a menos que se indique de otra manera. Para las plantas más grandes y/o donde la densidad de la vegetación sea alta, use la proporción más alta. En las plantas enredaderas que han alcanzado el estado leñoso de crecimiento, use las proporciones más altas. Los mejores resultados se obtienen cuando se aplica a finales del verano o en el otoño, después de la formación de frutos.

En zonas áridas, se obtienen mejores resultados cuando se aplica en la primavera o a principios del verano cuando las especies que crecen como matorrales tienen alto contenido de humedad y florecen.

Cuando haga tratamientos de rociado para mojar con equipos de mano, asegúrese de que la cobertura sea total. Cuando use equipos de mano para tratamientos localizados con rociado dirigido de poco volumen, aplique una solución del 4- al 8-por ciento de este producto.

Es posible que los síntomas no aparezcan antes de las heladas o del envejecimiento con tratamientos de otoño.

Permita que pasen 7 o más días después de la aplicación antes de labrar, segar o remover. Es posible que se necesite repetir el tratamiento para tratar plantas que emergen de partes enterradas o de semillas. Un poco de colorido otoñal es aceptable en plantas indeseables que pierden las hojas en el otoño, siempre y cuando no hayan sufrido mayor pérdida de hojas. Si la aplicación de otoño se realiza después de que hayan ocurrido heladas, es posible que se obtengan resultados deficientes.

ESPECIES DE MALEZAS	PROPORCIÓN (cuartos por acre)	% DE SOLUCIÓN DE MANO DE ROCIADO PARA MOJAR
Alder	2.3 – 3.0	0.75 – 1.2
Ash*	1.5 – 3.75	0.75 – 1.5
Aspen, quaking	1.5 – 2.3	0.75 – 1.2
Bearclover (Bearmat)*	1.5 – 3.75	0.75 – 1.5
Beech*	1.5 – 3.75	0.75 – 1.5
Birch	1.5	0.75
Blackberry	2.3 – 3.0	0.75 – 1.2
Blackgum	1.5 – 3.75	0.75 – 1.5
Bracken	1.5 – 3.75	0.75 – 1.5
Broom; French, Scotch	1.5 – 3.75	1.2 – 1.5
Buckwheat, California*	1.5 – 3.0	0.75 – 1.5
Cascara*	1.5 – 3.75	0.75 – 1.5
Castorbean	—	1.5

Catsclaw*	—	1.2 – 1.5
Ceanothus*	1.5 – 3.75	0.75 – 1.5
Chamise*	1.5 – 3.75	0.75
Cherry; bitter, black, pin	1.5 – 3.75	1.0 – 1.5
Cottonwood, eastern	1.5 – 3.75	0.75 – 1.5
Coyote brush	2.3 – 3.0	1.2 – 1.5
Cypress; swamp, bald	1.5 – 3.75	0.75 – 1.5
Deerweed	1.5 – 3.75	0.75 – 1.5
Dewberry	2.3 – 3.0	0.75 – 1.2
Dogwood*	3.0 – 3.75	1.0 – 2.0
Elderberry	1.5	0.75
Elm*	1.5 – 3.75	0.75 – 1.5
Eucalyptus	—	1.5
Gallberry	1.5 – 3.75	0.75 – 1.5
Gorse*	1.5 – 3.75	0.75 – 1.5
Hackberry, western	1.5 – 3.75	0.75 – 1.5
Hasardia*	1.5 – 3.0	0.75 – 1.5
Hawthorn	1.5 – 2.3	0.75 – 1.2
Hazel	1.5	0.75
Hickory*	3.0 – 3.75	1.0 – 2.0
Honeysuckle	2.3 – 3.0	0.75 – 1.2
Hornbeam, American*	1.5 – 3.75	0.75 – 1.5
Huckleberry	1.5 – 3.75	0.75 – 1.5
Ivy, poison	3.0 – 3.75	1.5
Knotweed; Bohemian, Giant, Japanese**	—	—
Kudzu	3.0	1.5
Locust, black*	1.5 – 3.0	0.75 – 1.5
Madrone resprouts*	—	1.5
Magnolia, sweetbay	1.5 – 3.75	0.75 – 1.5
Manzanita*	1.5 – 3.75	0.75 – 1.5
Maple, red	1.0 – 3.75	0.75 – 1.2
Maple, sugar	—	0.75 – 1.2
Maple, vine*	1.5 – 3.75	0.75 – 1.5
Monkey flower*	1.5 – 3.0	0.75 – 1.5
Oak; black, white*	1.5 – 3.0	0.75 – 1.5
Oak, northern, pin	1.5 – 3.0	0.75 – 1.2
Oak, poison	3.0 – 3.75	1.5
Oak, post	2.3 – 3.0	0.75 – 1.2
Oak, red	—	0.75 – 1.2
Oak, scrub*	1.5 – 3.0	0.75 – 1.5
Oak, southern red	1.5 – 3.75	1.0 – 1.5
Orange, Osage	1.5 – 3.75	0.75 – 1.5
Peppertree, Brazilian (Florida holly)*	1.5 – 3.75	1.5
Persimmon*	1.5 – 3.75	0.75 – 1.5
Pine	1.5 – 3.75	0.75 – 1.5
Poplar, yellow*	1.5 – 3.75	0.75 – 1.5
Prunus	1.5 – 3.75	1.0 – 1.5
Raspberry	2.3 – 3.0	0.75 – 1.2
Redbud, eastern	1.5 – 3.75	0.75 – 1.5
Redcedar, eastern	1.5 – 3.75	0.75 – 1.5
Rose, multiflora	1.5	0.75
Russian olive*	1.5 – 3.75	0.75 – 1.5
Sage, black	1.5 – 3.0	0.75
Sage, white*	1.5 – 3.0	0.75 – 1.5
Sage brush, California	1.5 – 3.0	0.75
Salmonberry	1.5	0.75
Saltbush	—	1.0
Saltcedar**	1.5 – 3.75	0.75 – 1.5
Sassafras*	1.5 – 3.75	0.75 – 1.5
Sea Myrtle	—	1.0
Sourwood*	1.5 – 3.75	0.75 – 1.5
Sumac; laurel, poison, smooth, sugarbush, winged*	1.5 – 3.0	0.75 – 1.5
Sweetgum	1.5 – 2.3	0.75 – 1.5
Swordfern*	1.5 – 3.75	0.75 – 1.5
Tallowtree, Chinese	—	0.75
Tan oak resprouts*	—	1.5
Thimbleberry	1.5	0.75
Tobacco, tree*	1.5 – 3.0	0.75 – 1.5
Toyon*	—	1.5
Trumpet creeper	1.5 – 2.3	0.75 – 1.2
Vine maple*	1.5 – 3.75	0.75 – 1.5
Virginia creeper	1.5 – 3.75	0.75 – 1.5
Waxmyrtle, southern*	1.5 – 3.75	1.5
Willow	2.3	0.75
Yerba Santa, California*	—	1.5

\*Control parcial

\*\*Consulte las instrucciones específicas más adelante

**Alder (Alico) / Blackberry (Zarza) / Dewberry (Zarza) / Honeysuckle (Madreselva) / Oak, Post / Raspberry (Frambuesa)**—Para control, aplique 2.3 a 3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1.2% con equipo de mano.

**Aspen, Quaking (Álamo) / Hawthorn (Espinillo) / Trumpetcreeper (Trompeta)**—Para control, aplique 1.5 a 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1.2% con equipo de mano.

**Birch (Abedul) / Elderberry (Sálico) / Hazel (Avellano) / Salmonberry / Thimbleberry**—Para control, aplique 1.5 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano.

**Broom (Retama): French, Scotch**—Para control, aplique una solución al 1.2-1.5% con equipo de mano.

**Buckwheat, California (Alforfón) / Hasardia / Monkey Flower / Tobacco, Tree (Tobaco, árbol)**—Para control parcial de estas especies, aplique una solución al 0.75-1.5% sobre las hojas mediante equipo de mano. Para lograr los mejores resultados es necesario cubrir completamente el follaje.

**Castorbean (Semilla de ricino)**—Para control, aplique una solución al 1.5 por ciento de este producto con equipo manual.

**Catsclaw (Uña de gato)**—Para control parcial, aplique una solución al 1.2-1.5% con equipo de mano, cuando al menos el 50% de las hojas nuevas esté totalmente desarrollado.

**Cherry (Cerezo): Bitter (Amargo), Black (Negro), Pin / Oak, Southern Red (Rojo del Sur) / Sweet Gum (Liquidambar) / Prunus**—Para control, aplique 1.5 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.0-1.5% con equipo de mano.

**Coyote brush**—Para control, aplique una solución al 1.2-1.5% con equipo de mano, cuando al menos el 50% de las hojas nuevas esté totalmente desarrollado.

**Dogwood / Hickory (Nogal)**—Para control parcial, aplique herbicida de AquaMaster como una solución al 1-2% con equipo de mano o a razón de 3 a 3.75 cuartos por acre por aspersión diseminada.

**Eucalyptus, (Eucalipto) Bluegum**—Para controlar los nuevos brotes de eucaliptos, aplique herbicida de AquaMaster como una solución al 1.5% con equipo de mano cuando los brotes tengan 6 a 12 pies (1.8 a 3.6 m) de altura. Verifique que la cobertura sea completa. Aplique cuando las plantas estén creciendo activamente. Evite aplicar cuando las plantas estén debilitadas por sequía.

**Knotweed; Bohemian, Giant, Japanese (*Polygonum bohemicum*, *P. sachalinense* and *P. cuspidatum*)**—Centidonia: Bohemia, Gigante, Japonesa (*Polygonum cuspidatum bohemicum*, *P. sachalinense* y *P. cuspidatum*)

Inyección en el tallo. Vea la sección "Inyección en el tallo" hueco de esta etiqueta.

**Tallo cortado.** Corte los tallos limpiamente justo debajo del segundo o tercer nodo sobre la superficie de la tierra. Aplique de inmediato 0.36 onza líquidas (10 mL) de solución de este producto al 50 por ciento en el "pozo" o espacio internodal que queda. Asegúrese que se colecte y deseche todo el material superior de las plantas, para que no tenga contacto con tierra y se regeneren las plantas a partir de los bulbos germinantes. Se recomienda usar una barrera biológica, como cartón, madera terciada o plástico.

El total de los tratamientos combinados no debe exceder 8 galones por acre. A razón de 10 mL de una solución al 50 por ciento, pueden tratarse aproximadamente 1500 tallos por acre.

**Kudzu (Kudzú)**—Para control, aplique 3 de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano. Para mantener el control, las aplicaciones deberán repetirse.

**Maple (Arce), Red (rojo)**—Para control, aplique una solución al 0.75-1.2% con equipo de mano cuando las hojas estén totalmente desarrolladas. Para control parcial, aplique 1 a 3.75 de herbicida de AquaMaster por acre por aspersión diseminada.

**Maple (Arce), Sugar (azúcar) / Oak (Roble): Northern Pin (pino del norte), Red (rojo)**—Para control, aplique una solución al 0.75-1.2% con equipo de mano, cuando al menos el 50% de las hojas nuevas esté totalmente desarrollado.

**Peppertree, Brazilian (Molle, Brasíero) (Holly, Florida) / Waxmyrtle, Southern**—Para control parcial, aplique una solución de herbicida de AquaMaster al 1.5% con equipo de mano.

**Poison Ivy (Hiedra venenosa) / Poison Oak (Zumaque)**—Para control, aplique 3 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 1.5% con equipo de mano. Para mantener el control, tal vez sea necesario repetir las aplicaciones. Los tratamientos en otoño deberán efectuarse antes de que las hojas pierdan su color verde.

**Rose, Multiflora (Rosa)**—Para control, aplique 1.5 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano. Los tratamientos deberán efectuarse antes de que las hojas se deterioren debido a insectos que se alimenten de ellas.

**Sage, Black / Sagebrush, California / Chamise / Tallowtree, Chinese (Árbol de Melisa)**—Para control de estas especies, aplique una solución al 0.75% sobre las hojas mediante equipo de mano. Para lograr los mejores resultados es necesario cubrir completamente el follaje.

**Saltbush, Sea myrtle**—Para control, aplique una solución de herbicida de AquaMaster al 1% con equipo de mano.

**Saltcedar (Pino salado)**—Para lograr un control parcial, aplique una solución de este producto al 1- a 2-por ciento con equipo manual, ó 3 a 3.75 cuartos por acre como rociado difundido. Para el control total, aplique una solución de este producto al 1- a 2-por ciento mezclada con 0.25 por ciento de Arsenal, utilizando equipo manual. Para el control con aplicación difundida, aplique una mezcla en tanque de 1.5 cuartos de este producto con 1 pinta de Arsenal a las plantas de menos de 6 pies de altura. Para controlar pinos salados de más de 6 pies de altura mediante aplicaciones difundidas, aplique una mezcla en tanque de 3 cuartos de producto con 2 pintas de Arsenal.

**Willow (Sauce)**—Para control, aplique 2.3 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75% con equipo de mano.

**Otros arbustos leñosos y árboles que figuran en esta etiqueta**—Para control parcial, aplique 1.5 a 3.75 cuartos de herbicida de AquaMaster por acre por aspersión diseminada o como una solución al 0.75-1.5% con equipo de mano.

## 10.0 LIMITES EN LA GARANTIA Y EN LA RESPONSABILIDAD

Monsanto Compañía garantiza que este producto concuerda con la descripción química de la etiqueta y es razonablemente adecuado para los propósitos descritos en el librito titulado Instrucciones Completas para el Uso ("Instrucciones") cuando se usa de acuerdo con dichas Instrucciones y las condiciones que allí se detallan. NO SE HACE NINGUNA OTRA GARANTIA EXPRESA O IMPLÍCITA ACERCA DE LA IDONEIDAD PARA UN USO PARTICULAR O COMERCIALIZACIÓN. Esta garantía está sujeta también a las condiciones y limitaciones que aquí se indican.

El comprador y todos los usuarios deberán reportar con prontitud a esta Compañía acerca de cualquier reclamo que se base en un contrato, negligencia, estricta responsabilidad, y otros actos ilícitos.

En la medida que lo permita la ley, el comprador y todos los usuarios son responsables por todas las pérdidas o daños que resultasen por el uso o manipulación en condiciones que estén más allá del control de esta Compañía, incluyendo pero no limitándose a: incompatibilidad con productos que no sean los señalados en las Instrucciones, aplicación o contacto con vegetación que no se quiera destruir, condiciones climáticas inusuales, condiciones de clima que estén fuera de los límites que se consideran normales en el lugar de la aplicación y para el período de tiempo en el cual se aplica, así como condiciones de clima que estén fuera de los límites indicados en las Instrucciones, aplicaciones que no estén explícitamente aconsejadas en las Instrucciones, condiciones de humedad que estén fuera de los límites establecidos en las Instrucciones, o la presencia de productos en la tierra o sobre ella, en las plantas o en la vegetación que se está tratando, diferentes a los indicados en las Instrucciones.

Monsanto Compañía no garantiza ninguno de los productos reformulados o reempacados de este producto, excepto de acuerdo a los requisitos de la administración de esta Compañía y con el permiso escrito expreso de esta Compañía.

LA UNICA Y EXCLUSIVA COMPENSACION AL USUARIO O COMPRADOR Y EL LIMITE DE RESPONSABILIDAD DE ESTA COMPAÑIA O DE CUALQUIER OTRO VENDEDOR POR CUALQUIER PERDIDA O POR TODAS LAS PERDIDAS, PERJUICIOS O DAÑOS QUE RESULTASEN DEL USO O MANEJO DE ESTE PRODUCTO (INCLUYENDO RECLAMOS QUE SE BASEN EN UN CONTRATO, NEGLIGENCIA, ESTRICTA RESPONSABILIDAD Y OTROS ACTOS ILICITOS) SERA EL PRECIO PAGADO POR EL USUARIO O EL COMPRADOR POR LA CANTIDAD INVOLUCRADA DE ESTE PRODUCTO, O A ELECCION DE ESTA COMPAÑIA O DE OTRO VENDEDOR, EL REEMPLAZO DE Dicha CANTIDAD, O SI NO SE OBTUVO MEDIANTE COMPRA SE REEMPLAZARA DICHA CANTIDAD DEL PRODUCTO. EN NINGUN CASO ESTA COMPAÑIA U OTRO VENDEDOR SERAN RESPONSABLES POR DAÑOS INCIDENTALES, CONSECUENTES O ESPECIALES.

En el momento de abrir y usar el producto, se asume que el comprador y todos los usuarios han aceptado las condiciones de los LIMITES EN LA GARANTIA Y EN LA RESPONSABILIDAD que no pueden variar por medio de ningún acuerdo verbal o escrito. Si las condiciones son inaceptables, devuelva el producto inmediatamente sin abrir el recipiente.

AquaMaster, Certainty, Outrider y Monsanto y el Vine diseño es una marca comercial de la empresa Monsanto Technology LLC.

Todas las otras marcas registradas son la propiedad de sus dueños respectivos.

Registro en la EPA Nº 524-343

Embalado Para:  
MONSANTO COMPANY  
800 N. LINDBERGH BLVD.  
ST. LOUIS, MISSOURI, 63167 U.S.A.  
©2009  
061709

# **ARSENAL<sup>®</sup>** **POWERLine<sup>™</sup>** herbicide

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**For the control of undesirable vegetation in grass pasture, rangeland and industrial noncropland areas including railroad, utility plant sites, petroleum tank farms, pumping installations, storage areas; utility, pipeline, and highway rights-of-way; fence rows; nonirrigation ditchbanks; and for the establishment and maintenance of wildlife openings**

**Active Ingredient:**

isopropylamine salt of imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-3-pyridinecarboxylic acid)\* ..... 26.7%

**Other Ingredients:** ..... 73.3%

**Total:** ..... 100.0%

\*Equivalent to 21.8% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-3-pyridinecarboxylic acid or 2 pounds acid per gallon.

EPA Reg. No. 241-431

U.S. Patent No. 4,798,619

EPA Est. No.

## **KEEP OUT OF REACH OF CHILDREN CAUTION/PRECAUCIÓN**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

See inside for complete **First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

**In case of an emergency endangering life or property involving this product,  
call day or night 1-800-832-HELP (4357).**

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**Net Contents:**

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BASF Corporation  
26 Davis Drive  
Research Triangle Park, NC 27709

 **BASF**  
The Chemical Company

FIRST AID	
If swallowed	<ul style="list-style-type: none"> <li>Call a poison control center or doctor immediately for treatment advice.</li> <li>Have person sip a glass of water if able to swallow.</li> <li><b>DO NOT</b> induce vomiting unless told to by a poison control center or doctor.</li> <li><b>DO NOT</b> give anything to an unconscious person.</li> </ul>
If in eyes	<ul style="list-style-type: none"> <li>Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes.</li> <li>Remove contact lenses, if present, after first 5 minutes; then continue rinsing eyes.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
If on skin	<ul style="list-style-type: none"> <li>Take off contaminated clothing.</li> <li>Rinse skin immediately with plenty of water for 15 to 20 minutes.</li> <li>Call a poison control center or doctor for treatment advice.</li> </ul>
If inhaled	<ul style="list-style-type: none"> <li>Move person to fresh air.</li> <li>If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably by mouth to mouth, if possible.</li> <li>Call a poison control center or doctor for further treatment advice.</li> </ul>

### HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357).

### PRECAUTIONARY STATEMENTS

#### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

##### CAUTION

Harmful if swallowed, causes moderate eye irritation. Avoid contact with eyes or clothing. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

#### Personal Protective Equipment (PPE)

Some materials that are chemical resistant to this product are barrier laminate, butyl rubber, or polyethylene. If you want more options, follow the instructions for **Category A** on an EPA chemical-resistance category selection chart.

#### Mixers, loaders, applicators, and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves for all mixers and loaders, plus applicators using handheld equipment

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. **DO NOT** reuse them.

#### Engineering Controls

Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)].

### User Safety Recommendations

#### Users should:

- Wash hands with plenty of soap and water before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

### PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of **Arsenal® PowerLine™ herbicide** should be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined steel containers.

**DO NOT** mix, store or apply **Arsenal PowerLine** or spray solutions of **Arsenal PowerLine** in unlined steel (except stainless steel) containers or spray tanks.

### ENVIRONMENTAL HAZARDS

This product is toxic to plants. Drift and runoff may be hazardous to plants in water adjacent to treated areas.

**DO NOT** apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. **DO NOT** contaminate water when disposing of equipment washwater or rinsate. See **DIRECTIONS FOR USE** for additional precautions and requirements.

### DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

**DO NOT** apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

**Arsenal® PowerLine™ herbicide** may be used only in accordance with instructions on the leaflet label attached to the container. Keep containers closed to avoid spills and contamination.

#### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

**DO NOT** enter or allow worker entry into treated areas during the restricted-entry interval (REI) of **48 hours**.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Protective eyewear
- Coveralls
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof material.

#### NONAGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Noncrop weed control is not within the scope of the Worker Protection Standard. See the **GENERAL INFORMATION** section of this label for a description of noncrop sites.

**DO NOT** enter or allow others to enter treated areas until sprays have dried.

#### STORAGE AND DISPOSAL

**DO NOT** contaminate water, food or feed by storage or disposal.

**Pesticide Storage.** **DO NOT** store below 10° F.

**Pesticide Disposal.** Wastes resulting from the use of this product may be disposed of on-site or at an approved waste disposal facility.

#### CONTAINER DISPOSAL

**Nonrefillable Container. DO NOT reuse or refill this container.** Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

**Triple rinse containers small enough to shake**

**(capacity ≤ 5 gallons) as follows:** Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

**Triple rinse containers too large to shake (capacity > 5 gallons) as follows:**

Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

**Pressure rinse as follows:** Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

**Refillable Container.** Refill this container with pesticide only. **DO NOT** reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

**Triple rinse as follows:** To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. **DO NOT** reuse the container for any other purpose. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and

closure devices. Check for leaks after refilling and before transport. **DO NOT** transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

#### In Case of Spill

In case of large-scale spillage regarding this product, call:  
CHEMTRIC 1-800-424-9300  
BASF Corporation 1-800-832-HELP (4357)

#### Steps to be taken in case material is released or spilled:

Dike and contain the spill with inert material (sand, earth, etc.) and transfer liquid and solid diking material to separate containers for disposal. Remove contaminated clothing, and wash affected skin areas with soap and water. Wash clothing before reuse. Keep the spill out of all sewers and open bodies of water.

#### IMPORTANT

**DO NOT** use on food crops. Keep from contact with fertilizers, insecticides, fungicides and seeds. **DO NOT** drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. **DO NOT** use on lawns, walks, driveways, tennis courts, or similar areas where roots of desirable vegetation may extend and be exposed to potential injury and/or mortality from root uptake of **Arsenal® PowerLine™ herbicide** unless this risk is acceptable. **DO NOT** side trim desirable vegetation with this product unless severe injury or plant death can be tolerated. Prevent drift of spray to desirable plants.

Clean application equipment after using this product by thoroughly flushing with water.

#### GENERAL INFORMATION

**Use Sites.** **Arsenal PowerLine** is an aqueous solution to be mixed with water and a surfactant and applied as a spray solution to grass pasture and rangeland and industrial noncropland including utility plant sites, petroleum tank farms, pumping installations, storage areas; railroad, utility, and highway rights-of-way; fence rows; and nonirrigation ditchbanks including grazed or hayed areas within these sites. **Arsenal PowerLine** is recommended for the establishment and maintenance of wildlife openings.

**Arsenal PowerLine** may also be used for the release of unimproved Bermudagrass (see specific directions) and for use under certain paved surfaces (see specific directions).

**Application Methods.** **Arsenal PowerLine** will control most annual and perennial grasses and broadleaf weeds in addition to many brush and vine species. **Arsenal PowerLine** will provide residual control of labeled weeds that germinate in the treated areas. This product may be applied either preemergence or postemergence to the weeds; however, postemergence application is the

method of choice in most situations, particularly for perennial species. For maximum activity, weeds should be growing vigorously at the time of postemergence application, and the spray solution should include a surfactant (see **ADJUVANTS** section for specific recommendations). These solutions may be applied selectively using low-volume techniques or may be applied broadcast by using ground equipment or aerial equipment. In addition, **Arsenal PowerLine** may also be used for stump and cut stem treatments (see specific directions).

**Herbicidal Activity.** **Arsenal PowerLine** is readily absorbed through leaves, stems, and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis appears first in the newest leaves, and necrosis spreads from this point. In perennials, the herbicide is translocated into, and kills, underground storage organs which prevents regrowth. Chlorosis and tissue necrosis may not be apparent in some plant species until 2 weeks after application. Complete kill of plants may not occur for several weeks. Applications of **Arsenal PowerLine** are rainfast 1 hour after treatment.

#### PRECAUTIONS FOR AVOIDING INJURY TO NONTARGET PLANTS

Untreated trees can occasionally be affected by root uptake of **Arsenal PowerLine** through movement into the top soil. Injury or loss of desirable trees or other plants may result if **Arsenal PowerLine** is applied on or near desirable trees or other plants, on areas where their roots extend, or in locations where the treated soil may be washed or moved into contact with their roots.

#### SPRAY DRIFT REQUIREMENTS

##### Aerial Applications

- Applicators are required to use a coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater for release heights below 10 feet. Applicators are required to use a very coarse or coarser droplet size or, if specifically using a spinning atomizer nozzle, applicators are required to use a VMD of 475 microns or greater for release heights above 10 feet. Applicators must consider the effects of nozzle orientation and flight speed when determining droplet size.
- Applicators are required to use upwind swath displacement.
- The boom length must not exceed 60% of the wingspan or 90% of the rotor blade diameter to reduce spray drift.
- Applications with wind speeds less than 3 mph and with wind speeds greater than 10 mph are prohibited.
- Applications into temperature inversions are prohibited.

##### Ground Boom Applications

- Applicators are required to use a nozzle height below 4 feet above the ground or plant canopy and coarse or

coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater.

- Applications with wind speeds greater than 10 mph are prohibited.
- Applications into temperature inversions are prohibited.

### Wind Erosion

Avoid treating powdery, dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

### ADJUVANTS

**Postemergence applications of Arsenal® PowerLine™ herbicide require the addition of a spray adjuvant for optimum herbicide performance.**

**Nonionic Surfactants.** Use a nonionic surfactant (NIS) at the rate 0.25% volume/volume (v/v) or higher (see manufacturer's label) of the spray solution (0.25% v/v is equivalent to 1 quart in 100 gallons). For best results, select a nonionic surfactant with an HLB (hydrophilic to lipophilic balance) ratio between 12 and 17 with at least 70% surfactant in the formulated product (alcohols, fatty acids, oils, ethylene glycol or diethylene glycol should not be considered as surfactants to meet the above requirements).

#### Methylated Seed Oils (MSO) or Vegetable Oil Concentrates.

Instead of a surfactant, a methylated seed oil or vegetable-based seed oil concentrate may be used at the rate of 1.5 to 2 pints per acre. When using spray volumes greater than 30 gallons per acre, methylated seed oil or vegetable-based seed oil concentrates should be mixed at a rate of 1% of the total spray volume, or alternatively use a nonionic surfactant as described above. Research indicates that these oils may aid in **Arsenal PowerLine** deposition and uptake by plants under moisture or temperature stress.

**Silicone-based Surfactants.** See manufacturer's label for specific rate recommendations. Silicone-based surfactants may reduce the surface tension of the spray droplet allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants. However, some silicone-based surfactants may dry too quickly, limiting herbicide uptake.

**Fertilizer/Surfactant Blends.** Nitrogen-based liquid fertilizers, such as 28%N, 32%N, 10-34-0 or ammonium sulfate, may be added at the rate of 2 to 3 pints per acre in combination with the recommended rate of nonionic surfactant, methylated seed oil or vegetable/seed oil concentrate. The use of fertilizers in a tank mix without a nonionic surfactant, methylated seed oil or vegetable/seed oil concentrate is not recommended.

## APPLICATION METHODS

### AERIAL APPLICATIONS

All precautions should be taken to minimize or eliminate spray drift. Fixed-wing aircraft and helicopters can be used to apply **Arsenal PowerLine**. However, **DO NOT** make applications by fixed-wing aircraft unless appropriate buffer zones can be maintained to prevent spray drift out of the target area or, when treating open tracts of land, spray drift as a result of fixed-wing aircraft application can be tolerated. Aerial equipment designed to minimize spray drift, such as a helicopter equipped with a **Microfoil™ boom**, **Thru-Valve™ boom** or raindrop nozzles, must be used and calibrated. Except when applying with a **Microfoil boom**, a drift control agent may be added at the recommended label rate. To avoid drift, applications should not be made during inversion conditions, when winds are gusty, or any other conditions which allow drift. Side trimming is not recommended with **Arsenal PowerLine** unless death of treated tree can be tolerated.

Uniformly apply the specified amount of **Arsenal PowerLine** in 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift. Include in the spray solution a nonionic surfactant or methylated seed oil or manufacturer's label rate of a silicone-based surfactant (see the **ADJUVANTS** section of this label for specific recommendations). A foam-reducing agent may be added at the recommended label rate, if needed.

**IMPORTANT.** Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

### GROUND APPLICATIONS

**Broadcast.** Use 5 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift. To minimize spray drift, select proper nozzles to avoid spraying a fine mist. Use pressures less than 50 psi, and **DO NOT** spray under gusty or windy conditions. Add a foam-reducing agent, if needed, and a spray pattern indicator, if desired, at the recommended label rates. Clean application equipment after using this product by thoroughly flushing with water.

When making applications to rights-of-way corridors where desirable tree roots may extend, use 1 to 3 pints of **Arsenal PowerLine** per acre in combination with recommended tank mixes. Use rates higher than 3 pints per acre in these situations may cause injury or death of desirable trees when their roots extend into treated zones.

## FOLIAR

### Side Trimming

**DO NOT** side trim with **Arsenal® PowerLine™ herbicide** unless severe injury or death of the treated tree can be tolerated. **Arsenal PowerLine** is readily translocated and can result in death of the entire tree.

### Low-volume Foliar

Use equipment calibrated to deliver 5 to 20 gallons of spray solution per acre. To prepare the spray solution, thoroughly mix in water 0.5% to 5% **Arsenal PowerLine** plus surfactant (see the **ADJUVANTS** section of this label for specific recommendations). A foam-reducing agent may be applied at the recommended label rate, if needed. For control of difficult brush species (see **WEEDS**

**CONTROLLED** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but **DO NOT** apply more than 6 pints of **Arsenal PowerLine** per acre. Excessive wetting of foliage is not recommended. See the following mixing guide for some suggested volumes of **Arsenal PowerLine** and water.

## TANK MIXES AND APPLICATION RATES\*

Target Vegetation	Rate of Arsenal® PowerLine™ herbicide	Tank Mix
Mixed hardwoods without elm, locust, or pine	1.0 to 1.5% by volume	Surfactant
Mixed hardwoods containing elm, locust, and pine	0.5 to 1.0% by volume	Accord® at 2 to 3% by volume plus surfactant
Mixed hardwoods with locust and pine, but no elm	0.5 to 1.0% by volume	Krenite® at 2 to 5% by volume plus surfactant
Mixed hardwoods with locust and elm, but no pine	0.5 to 1.0% by volume	Escort® at 2 ozs/acre or 2.3 grams/gallon plus surfactant

\*Tank mixes with 2,4-D or products containing 2,4-D have resulted in reduced efficacy of **Arsenal PowerLine**.

### MIXING CHART

% Solution	Arsenal PowerLine per Gallon of Mix (fl ozs)	Arsenal PowerLine per 4-gallon Backpack (fl ozs)
0.5%	0.6	2.6
1.0%	1.3	5.1
2.0%	2.6	10.2
3.0%	3.8	15.4
5.0%	6.4	25.6

### MEASURING CHART

128 fluid ounces	=	1 gallon
16 fluid ounces	=	1 pint
8 pints	=	1 gallon
4 quarts	=	1 gallon
2 pints	=	1 quart

**Application Instructions.** For low volume, select proper nozzles so that herbicide is not overapplied. Best results are achieved when the spray covers the crown and approximately 70% of the plant. The use of an even flat-fan tip with a spray angle of 40 degrees or less will aid in proper deposition.

Recommended tip sizes include 4004E or 1504E. For a straight stream and cone pattern, adjustable cone nozzles, such as 5500 X3 or 5500 X4, may be used. Attaching a roll-over valve onto a Spraying Systems Model 30 gunjet or other similar spray guns allows for the use of both a flat-fan and cone tips on the same gun.

**Proper Spray Pattern.** Moisten but **DO NOT** drench target vegetation causing spray solution to run off.

**Low Volume with Backpacks.** For brush up to 4-feet tall, spray down on the crown covering crown and penetrating approximately 70% of the plant.

For brush 4-feet to 8-feet tall, swipe the sides of target vegetation by directing spray to at least 2 sides of the plant in smooth vertical motions from the crown to the bottom. Make sure to cover the crown whenever possible.

For brush over 8-feet tall, lace sides of the brush by directing spray to at least 2 sides of the target in smooth zigzag motions from crown to bottom.

**Low Volume with Hydraulic Handgun Application Equipment.** Use same technique as described for **Low Volume with Backpacks**.

For broadcast applications, simulate a gentle rain near the top of target vegetation allowing spray to contact the crown and penetrate the target foliage without falling to the understory. Herbicide spray solution that contacts the understory may result in severe injury or death of plants in the understory.

SPRAY SOLUTION MIXING GUIDE FOR LOW-VOLUME APPLICATIONS					
Amount of Spray Solution Prepared (gallons)	Desired Concentration (fluid volume)				
	0.5%	0.75%	1%	1.5%	5%
	(amount of Arsenal® PowerLine™ herbicide to use)				
1	0.6 fl oz	0.9 fl oz	1.3 fl ozs	1.9 fl ozs	6.5 fl ozs
3	1.9 fl ozs	2.8 fl ozs	3.8 fl ozs	5.8 fl ozs	1.2 pints
4	2.5 fl ozs	3.8 fl ozs	5.1 fl ozs	7.7 fl ozs	1.6 pints
5	3.2 fl ozs	4.8 fl ozs	6.5 fl ozs	9.6 fl ozs	2 pints
50	2 pints	3 pints	4 pints	6 pints	10 quarts
100	4 pints	6 pints	8 pints	6 quarts	5 gallons

2 tablespoons = 1 fluid ounce

#### High-volume Foliar

For optimum performance when spraying medium-density to high-density brush, use equipment calibrated to deliver up to 100 gallons of spray solution per acre (GPA). Spray solutions exceeding 100 GPA may result in excessive spray runoff causing increased ground cover injury and injury to desirable species.

To prepare the spray solution, thoroughly mix **Arsenal PowerLine** at a rate of 2 to 6 pints per acre (see **GROUND APPLICATIONS** section) in water and add a surfactant (see **ADJUVANTS** section for specific recommendations and rates of surfactants). A foam-reducing agent may be added at the recommended label rate, if needed. For control of difficult species (see **WEEDS CONTROLLED** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but **DO NOT** apply more than 6 pints of **Arsenal PowerLine** per acre. Uniformly cover the foliage of the vegetation to be controlled, but **DO NOT** apply to runoff. Excessive wetting of foliage is not recommended.

#### Tank Mixes for Brush Control

**Arsenal PowerLine** may be tank mixed with **Accord**®, **Banvel**®, **Escort**®, **Garlon**® 3A, **Krenite**®, **Roundup**®, **Telar**®, **Tordon**® K, and **Vanquish**® to provide control of **Arsenal PowerLine**-tolerant species.

Consult manufacturer's labels for specific rates and weeds controlled. Always follow the more restrictive label when making an application involving tank mixes. Tank mixing with 2,4-D, or products which contain 2,4-D, has resulted in reduced performance of **Arsenal PowerLine**.

**Invert Emulsions.** **Arsenal PowerLine** can be applied as an invert emulsion. The spray solution results in an invert (water-in-oil) spray emulsion designed to minimize spray drift and spray runoff resulting in more herbicide on the target foliage. The spray emulsion may be formed in a single tank (batch mixing) or injected (in-line mixing). Consult the invert chemical label for proper mixing directions.

## CUT SURFACE

### Cut Stubble

**Arsenal® PowerLine™ herbicide** can be applied within 2 weeks after mechanical mowing or cutting of brush. To suppress or control resprouting, uniformly apply a spray solution of **Arsenal PowerLine** at the rate of 1 to 2 pints per acre to the cut area. **Arsenal PowerLine** may be tank mixed with **Tordon® K** or picloram to aid in control or suppression of brush. The addition of 5% (v/v) or more of a penetrating agent can aid in uptake through the bark or exposed roots.

Cut stubble applications are made to the soil and cut brush stumps. This type of application may increase ground cover injury. However, vegetation will recover. Making applications of **Arsenal PowerLine** directly to the soil can increase potential root uptake causing injury or death of desirable trees.

Efficacy can be increased, and root uptake by desirable vegetation can be decreased, if the brush is allowed to regrow and the foliage is treated. See the **APPLICATION METHODS** section of this label.

### Stump and Cut-stem Treatments

**Arsenal PowerLine** may be used to control undesirable woody vegetation on noncropland by applying the **Arsenal PowerLine** solution to the cambium area of freshly cut stump surfaces or to fresh cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring. **DO NOT** overapply solution causing runoff or puddling.

**Mixing.** **Arsenal PowerLine** may be mixed as either a concentrated or dilute solution for stump and cut stem treatments. The dilute solution may be used for applications to the surface of the stump or to cuts on the stem of the target woody vegetation. Concentrated solutions may be used for applications to cuts on the stem. Use of the concentrated solution permits application to fewer cuts on the stem, especially for large-diameter trees. Follow the application instructions to determine proper application techniques for each type of solution.

To prepare a dilute solution, mix 8 to 12 fluid ounces of **Arsenal PowerLine** with 1 gallon of water. If temperatures are such that freezing of the spray mixture may occur, antifreeze (ethylene glycol) may be used according to manufacturer's label to prevent freezing. The use of a surfactant or penetrating agent may improve uptake through partially callused cambiums. To prepare a concentrated solution, mix 2 quarts of **Arsenal PowerLine** with no more than 1 quart of water.

### Application with Dilute Solutions

**For cut stump treatments.** Spray or brush the solution onto the cambium area of the freshly cut stump surface. Ensure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

**For tree-injection treatments.** Using standard injection equipment, apply 1 milliliter of solution at each injection

site around the tree with no more than 1-inch intervals between cut edges. Ensure that the injector completely penetrates the bark at each injection site.

**For frill or girdle treatments.** Using a hatchet, machete, or similar device, make cuts through the bark at intervals around the tree with no more than 2-inch intervals between cut edges. Spray or brush the solution into each cut until thoroughly wet.

### Application with Concentrated Solutions

**For tree injection treatments.** Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least 1 injection cut for every 3 inches of Diameter at Breast Height (DBH) on the target tree. For example, a 3-inch DBH tree will receive 1 injection cut, and a 6-inch DBH tree will receive 2 injection cuts. On trees requiring more than 1 injection site, place the injection cuts at approximately equal intervals around the tree.

**For frill or girdle treatments.** Using a hatchet, machete, or similar device, make cuts through the bark at approximately equal intervals around the tree. Make at least 1 cut for every 3 inches of DBH on the target tree. For example, a 3-inch DBH tree will receive 1 cut, and a 6-inch DBH tree will receive 2 cuts. Spray or brush the solution into each cut until thoroughly wet.

**NOTE:** Injury may occur to desirable woody plants if the shoots extend from the same root system or their root systems are grafted to those of the treated tree.

## FOR CONTROL OF UNDESIRABLE WEEDS UNDER PAVED SURFACES

**Arsenal PowerLine** can be used under asphalt, pond liners and other paved areas ONLY in industrial sites or where the pavement has a suitable barrier along the perimeter that prevents encroachment of roots of desirable plants.

**Arsenal PowerLine** should be used only where the area to be treated has been prepared according to good construction practices. If rhizomes, stolons, tubers or other vegetative plant parts are present in the site, they should be removed by scalping with a grader blade to a depth sufficient to insure their complete removal.

**IMPORTANT.** Paving should follow **Arsenal PowerLine** applications as soon as possible. **DO NOT** apply where the chemical may contact the roots of desirable trees or other plants.

The product may not be used under pavement on residential properties such as driveways or parking lots, nor in recreational areas such as under bike or jogging paths, golf-cart paths, or tennis courts, or where landscape plantings could be anticipated. Injury or death of desirable plants may result if this product is applied where roots are present or where they may extend into the treated area. Roots of trees and shrubs may extend a considerable distance beyond the branch extremities or drip line.

## APPLICATION DIRECTIONS FOR USE UNDER PAVED SURFACES

Applications should be made to the soil surface only when final grade is established. **DO NOT** move soil following **Arsenal® PowerLine™ herbicide** application.

Apply **Arsenal PowerLine** in sufficient water (at least 100 gallons per acre) to ensure thorough and uniform wetting of the soil surface, including the shoulder areas. Add **Arsenal PowerLine** at a rate of 6 pints per acre (2.2 fl ozs per 1000 square feet) to clean water in the spray tank during the filling operation. Agitate before spraying.

If the soil is not moist prior to treatment, incorporation of **Arsenal PowerLine** is needed for herbicide activation.

**Arsenal PowerLine** can be incorporated into the soil to a depth of 4 to 6 inches using a rototiller or disc. Rainfall or irrigation of 1 inch will also provide uniform incorporation. **DO NOT** allow treated soil to wash or move into untreated areas.

## FOR CONTROL OF UNDESIRABLE WEEDS IN UNIMPROVED BERMUDAGRASS AND BAHIAGRASS

**Arsenal PowerLine** may be used on unimproved Bermudagrass and Bahiagrass turf on roadsides, utility rights-of-way and other noncropland industrial sites. The application of **Arsenal PowerLine** on established common and coastal Bermudagrass and Bahiagrass provides control of labeled broadleaf and grass weeds. Competition from these weeds is eliminated, releasing the Bermudagrass and Bahiagrass. Treatment of Bermudagrass with **Arsenal PowerLine** results in a compacted growth habit and seed-head inhibition.

Uniformly apply with properly calibrated ground equipment using at least 10 gallons of water per acre with a spray pressure 20 to 50 psi.

**IMPORTANT.** Temporary yellowing of grass may occur when treatment is made after growth commences.

**DO NOT** add surfactant in excess of the recommended rate (1 fl oz per 25 gallons of spray solution).

**DO NOT APPLY** to grass during its first growing season.

**DO NOT APPLY** to grass that is under stress from drought, disease, insects, or other causes.

## DOSAGE RATES AND TIMING

### BERMUDAGRASS

Apply **Arsenal PowerLine** at 6 fl ozs to 12 fl ozs per acre when the Bermudagrass is dormant. Apply **Arsenal PowerLine** at 6 fl ozs to 8 fl ozs per acre after the Bermudagrass has reached full green-up. Applications made during green-up will delay green-up. Include a surfactant in the spray solution (see preceding **IMPORTANT** statements).

For additional preemergence control of annual grasses and small-seeded broadleaf weeds, add **Pendulum® herbicide** at the rate of 3.3 lbs to 6.6 lbs per acre. Consult the **Pendulum** label for weeds controlled and for other use directions and precautions.

For control of Johnsongrass in Bermudagrass turf, apply **Arsenal PowerLine** at 8 fl ozs per acre plus **Roundup® herbicide** at 12 fl ozs per acre plus surfactant. For additional control of broadleaves and vines, **Garlon® 3A** may be added to the above mix at the rate of 1 to 2 pints per acre. Observe all precautions and restrictions on the **Garlon 3A** and **Roundup** labels.

### BAHIAGRASS

Apply **Arsenal PowerLine** at 4 fl ozs to 8 fl ozs per acre when the Bahiagrass is dormant or after the grass has initiated green-up but has not exceeded 25% green-up. Include in the spray solution a surfactant (see **ADJUVANTS** section for specific recommendations on surfactants).

## Weeds Controlled

Bedstraw	<i>Gallium</i> spp.
Bishopweed	<i>Ptilimnium capillaceum</i>
Buttercup	<i>Ranunculus parviflorus</i>
Carolina geranium	<i>Geranium carolinianum</i>
Fescue	<i>Festuca</i> spp.
Foxtail	<i>Setaria</i> spp.
Little barley	<i>Hordeum pusillum</i>
Seedling Johnsongrass	<i>Sorghum halepense</i>
White clover	<i>Trifolium repens</i>
Wild carrot	<i>Daucus carota</i>
Yellow woodsorrel	<i>Oxalis stricta</i>

## GRASS GROWTH AND SEED-HEAD SUPPRESSION

**Arsenal PowerLine** may be used to suppress growth and seed-head development of certain turfgrass in unimproved areas. When applied to desirable turf, **Arsenal PowerLine** may result in temporary turf damage and/or discoloration. Effects to the desirable turf may vary with environmental conditions. For optimum performance, application should be made prior to culm elongation. Applications may be made before or after mowing. If applied prior to mowing, allow at least 3 days of active growth before mowing. If following a mowing, allow sufficient time for the grasses to recover before applying this product or injury may be amplified.

**DO NOT APPLY** to turf under stress (drought, cold, insect damaged, etc.) or severe injury or death may occur.

### BERMUDAGRASS

Apply **Arsenal PowerLine** at 6 ozs to 8 ozs per acre from early green-up to prior to seed-head initiation.

**DO NOT** add a surfactant for this application.

### COOL SEASON UNIMPROVED TURF

Apply **Arsenal PowerLine** at 2 fl ozs per acre plus 0.25% nonionic surfactant. For increased suppression, **Arsenal PowerLine** may be tank mixed with such products as **Campaign®** (24 ozs per acre) or **Embark®** (8 ozs per acre).

Tank mixes may increase injury to desired turf. Consult each product label for recommended turf species and other use directions and precautions. Tank mixes with 2,4-D or products containing 2,4-D may decrease the effectiveness of **Arsenal® PowerLine™** herbicide.

#### TOTAL VEGETATION CONTROL WHERE BARE GROUND IS DESIRED

**Arsenal PowerLine** is an effective herbicide for preemergence or postemergence control of many annual and perennial broadleaf and grass weeds where bare ground is desired. **Arsenal PowerLine** is particularly effective on hard-to-control perennial grasses. **Arsenal PowerLine** at 1.5 pints to 6 pints per acre can be used alone or in tank mix with herbicides such as **Banvel®**, **Finale®**, **Karmex®**, **Oust®**, **Pendulum®**, **Roundup®**, simazine, or **Vanquish®**. The degree and duration of control are dependent on the rate of **Arsenal PowerLine** used, tank mix partner, the volume of carrier, soil texture, rainfall and other conditions.

Consult manufacturers labels for specific rates and weeds controlled. Always follow the more restrictive label when making an application involving tank mixes.

#### TANK MIX INSTRUCTIONS FOR BARE GROUND

##### Herbicide Rates per Acre\*

Arsenal PowerLine	Pendulum® WDG herbicide	Pendulum® 3.3 EC herbicide	Diuron
Rate in pints	in lbs	in quarts	in lbs ai
1.5 to 3	6.6	4.8	4 to 6
2 to 4	6.6	4.8	6 to 10
3 to 6	6.6	4.8	8 to 12

\*Use higher rates for fall applications and in areas that have not been previously treated or that feature heavy infestations.

Applications of **Arsenal PowerLine** may be made at any time of the year. Use equipment calibrated to deliver desired gallons per acre spray volume and uniformly distribute the spray pattern over the treated area.

**Postemergence Applications.** Always use a spray adjuvant (see **ADJUVANTS** section of this label) when making a postemergence application. For optimum performance on tough-to-control annual grasses, applications should be made at a total volume of 100 gallons per acre or less. For quicker burndown or brown-out of target weeds, **Arsenal PowerLine** may be tank mixed with products such as **Finale** or **Roundup**. Tank mixes with 2,4-D or products containing 2,4-D have reduced performance of **Arsenal PowerLine**. Always follow the more restrictive label when tank mixing.

#### SPOT TREATMENTS

**Arsenal PowerLine** may be used as a follow-up treatment to control escapes or weed encroachment in a bare-ground situation. To prepare the spray solution, thoroughly mix in each gallon of water 0.5% to 5% **Arsenal PowerLine** plus an adjuvant. For increased burndown,

include **Finale** or **Roundup**, or similar products. For added residual weed control or to increase the weed spectrum, add **Pendulum** or diuron. Always follow the more restrictive label when tank mixing.

#### FOR SPOT TREATMENT WEED CONTROL IN GRASS PASTURE AND RANGELAND

For the control of undesirable vegetation in grass pasture and rangeland, **Arsenal PowerLine** may be applied as a spot treatment at a rate of 2 fl ozs to 48 fl ozs of product per treated acre using any of the described ground application methods. Spot applications to grass pasture and rangeland may not exceed more than 1/10 of the area to be grazed or cut for hay. See appropriate sections of this label for specific use directions for the application method and vegetation control desired. **DO NOT** apply more than 48 fl ozs per acre per year.

#### GRAZING AND HAYING RESTRICTIONS

There are no grazing restrictions following **Arsenal PowerLine** application. **DO NOT** cut forage grass for hay for 7 days after **Arsenal PowerLine** application.

#### INSTRUCTIONS FOR RANGELAND USE

**Arsenal PowerLine** may be applied to rangeland for the control of undesirable vegetation to achieve 1 or more of the following vegetation management objectives:

1. To control undesirable (nonnative, invasive and noxious) plant species
2. To control undesirable vegetation to aid in the establishment of desirable rangeland plant species
3. To control undesirable vegetation to aid in the establishment of desirable rangeland vegetation following a fire
4. To control undesirable vegetation to reduce wildfire fuel
5. To release existing desirable rangeland plant communities from the competitive pressure of undesirable plant species
6. To control undesirable vegetation to improve wildlife habitat

To ensure the protection of threatened and endangered plants when applying **Arsenal PowerLine** to rangeland:

1. Federal agencies must follow NEPA regulations to ensure protection of threatened and endangered plants.
2. State agencies must work with the Fish and Wildlife Service or the Service's designated state conservation agency to ensure protection of threatened and endangered plants.
3. Other organizations or individuals must operate under a Habitat Conservation Plan if threatened or endangered plants are known to be present on the land to be treated.

See the appropriate section(s) of this label for specific use directions for the desired rangeland vegetation management objective.

**Arsenal PowerLine** should only be applied to a given rangeland acre as specific weed problems arise. Long-term control of undesirable weed species ultimately

depends on the successful use of land management practices that promote the growth and sustainability of desirable rangeland plant species.

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#### ROTATIONAL CROP INSTRUCTIONS

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Rotational crops may be planted 12 months after applying **Arsenal® PowerLine™ herbicide** at the specified pasture and rangeland rate. Following 12 months after an **Arsenal PowerLine** application and before planting any crop, a successful field bioassay must be completed. The field bioassay consists of a test strip of the intended rotational crop planted in the previously treated area in the grass pasture/rangeland and grown to maturity. The test strip should include low areas and knolls, and include variations in soil type and pH within the treated area. If no crop injury is evident in the test strip, the intended rotational crop may be planted the following year.

Use of **Arsenal PowerLine** in accordance with label directions is expected to result in normal growth of rotational crops in most situations; however, various environmental and agronomic factors make it impossible to eliminate all risks associated with the use of this product and, therefore, rotational crop injury is always possible.

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#### WEEDS CONTROLLED BY ARSENAL POWERLINE

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**Arsenal PowerLine** will provide preemergence or post-emergence control with residual control of the following target vegetation species at the rates listed. Residual control refers to control of newly germinating seedlings in both annuals and perennials. In general, annual weeds may be controlled by preemergence or postemergence applications of **Arsenal PowerLine**.

**For established biennials and perennials, postemergence applications of Arsenal PowerLine are recommended.** The rates shown below pertain to broadcast applications and indicate the relative sensitivity of these weeds. The relative sensitivity should be referenced when preparing low-volume spray solutions (see **Low-volume Foliar** section of **GROUND APPLICATIONS**); low-volume applications may provide control of the target species with less **Arsenal PowerLine** per acre than is shown for the broadcast treatments. **Arsenal PowerLine** may be used only in accordance with the instructions on this label.

#### RESISTANT BIOTYPES

Naturally occurring biotypes (a plant within a given species that has a slightly different but distinct genetic makeup from other plants of the same species) of some weeds listed on this label may not be effectively controlled by this and/or other herbicides (**Oust®**) with the ALS/AHAS enzyme-inhibiting mode of action. If naturally occurring ALS/AHAS-resistant biotypes are present in an area, **Arsenal PowerLine** should be tank mixed or applied sequentially with an appropriate registered herbicide having a different mode of action to ensure control.

## GRASSES

Common Name	Species	Growth Habit <sup>2</sup>
<b>Apply 2 to 3 pints per acre<sup>1</sup></b>		
Annual bluegrass	( <i>Poa annua</i> )	A
Broadleaf signalgrass	( <i>Brachiaria platyphylla</i> )	A
Canada bluegrass	( <i>Poa compressa</i> )	P
Downy brome	( <i>Bromus tectorum</i> )	A
Fescue	( <i>Festuca spp.</i> )	A/P
Foxtail	( <i>Setaria spp.</i> )	A
Italian ryegrass	( <i>Lolium multiflorum</i> )	A
Johnsongrass	( <i>Sorghum halepense</i> )	P
Kentucky bluegrass	( <i>Poa pratensis</i> )	P
Lovegrass	( <i>Eragrostis spp.</i> )	A/P
Orchardgrass	( <i>Dactylis glomerata</i> )	P
Paragrass	( <i>Brachiaria mutica</i> )	P
Quackgrass	( <i>Agropyron repens</i> )	P
Sandbur	( <i>Cenchrus spp.</i> )	A
Sand dropseed	( <i>Sporobolus cryptandrus</i> )	A
Smooth brome	( <i>Bromus inermis</i> )	P
Vaseygrass	( <i>Paspalum urvillei</i> )	P
Wild oats	( <i>Avena fatua</i> )	A
Witchgrass	( <i>Panicum capillare</i> )	A
<b>Apply 3 to 4 pints per acre<sup>1</sup></b>		
Barnyardgrass <sup>3</sup>	( <i>Echinochloa crus-galli</i> )	A
Beardgrass	( <i>Andropogon spp.</i> )	P
Bluegrass, annual <sup>3</sup>	( <i>Poa annua</i> )	A
Cheat	( <i>Bromus secalinus</i> )	A
Crabgrass	( <i>Digitaria spp.</i> )	A
Crowfootgrass <sup>3</sup>	( <i>Dactyloctenium aegyptium</i> )	A
Fall panicum	( <i>Panicum dichotomiflorum</i> )	A
Giant reed	( <i>Arundo donax</i> )	P
Goosegrass	( <i>Eleusine indica</i> )	A
Itchgrass <sup>3</sup>	( <i>Rottboellia exaltata</i> )	A
Junglerice <sup>3</sup>	( <i>Echinochloa colonum</i> )	A
Lovegrass <sup>3</sup>	( <i>Eragrostis spp.</i> )	A
Maidencane	( <i>Panicum hemitomon</i> )	A
Panicum, browntop <sup>3</sup>	( <i>Panicum fasciculatum</i> )	A
Panicum, Texas <sup>3</sup>	( <i>Panicum texanum</i> )	A
Prairie threeawn	( <i>Aristida oligantha</i> )	P
Reed canarygrass	( <i>Phalaris arundinacea</i> )	P
Sandbur, field <sup>3</sup>	( <i>Cenchrus incertus</i> )	A
Signalgrass <sup>3</sup>	( <i>Brachiaria spp.</i> )	A
Torpedograss	( <i>Panicum repens</i> )	P
Wild barley	( <i>Hordeum spp.</i> )	A
Wooly cupgrass <sup>3</sup>	( <i>Eriochloa villosa</i> )	A

## GRASSES (*continued*)

Common Name	Species	Growth Habit <sup>2</sup>
<b>Apply 4 to 6 pints per acre<sup>1</sup></b>		
Bahiagrass	( <i>Paspalum notatum</i> )	P
Bermudagrass <sup>4</sup>	( <i>Cynodon dactylon</i> )	P
Big bluestem	( <i>Andropogon gerardii</i> )	P
Cattail	( <i>Typha spp.</i> )	P
Cogongrass	( <i>Imperata cylindrica</i> )	P
Dallisgrass	( <i>Paspalum dilatatum</i> )	P
Feathertop	( <i>Pennisetum villosum</i> )	P
Guineagrass	( <i>Panicum maximum</i> )	P
Phragmites	( <i>Phragmites australis</i> )	P
Prairie cordgrass	( <i>Spartina pectinata</i> )	P
Saltgrass <sup>4</sup>	( <i>Distichlis stricta</i> )	P
Sand dropseed	( <i>Sporobolus cryptandrus</i> )	P
Sprangletop <sup>3</sup>	( <i>Leptochloa spp.</i> )	A
Timothy	( <i>Phleum pratense</i> )	P
Wirestem muhly	( <i>Muhlenbergia frondosa</i> )	P

## BROADLEAF WEEDS

**Apply 2 to 3 pints per acre<sup>1</sup>**

African rue	( <i>Peganum harmala</i> )	P
Alligatorweed	( <i>Alternanthera philoxeroides</i> )	A/P
Burdock	( <i>Arctium spp.</i> )	B
Carolina geranium	( <i>Geranium carolinianum</i> )	A
Carpetweed	( <i>Mollugo verticillata</i> )	A
Clover	( <i>Trifolium spp.</i> )	A/P
Common chickweed	( <i>Stellaria media</i> )	A
Common ragweed	( <i>Ambrosia artemisiifolia</i> )	A
Dandelion	( <i>Taraxacum officinale</i> )	P
Dogfennel	( <i>Eupatorium capillifolium</i> )	A
Filaree	( <i>Erodium spp.</i> )	A
Fleabane	( <i>Erigeron spp.</i> )	A
Hoary vervain	( <i>Verbena stricta</i> )	P
Indian mustard	( <i>Brassica juncea</i> )	A
Kochia <sup>5</sup>	( <i>Kochia scoparia</i> )	A
Lambsquarters	( <i>Chenopodium album</i> )	A
Lespedeza	( <i>Lespedeza spp.</i> )	P
Miners lettuce	( <i>Montia perfoliata</i> )	A
Mullein	( <i>Verbascum spp.</i> )	B
Nettleleaf goosefoot	( <i>Chenopodium murale</i> )	A
Oxeye daisy	( <i>Chrysanthemum leucanthemum</i> )	P
Pepperweed	( <i>Lepidium spp.</i> )	A
Pigweed	( <i>Amaranthus spp.</i> )	A
Puncturevine	( <i>Tribulus terrestris</i> )	A
Russian thistle	( <i>Salsola kali</i> )	A
Smartweed	( <i>Polygonum spp.</i> )	A
Sorrel	( <i>Rumex spp.</i> )	P
Sunflower	( <i>Helianthus spp.</i> )	A
Sweet clover	( <i>Melilotus spp.</i> )	A
Tansymustard	( <i>Ambrosia psilostachya</i> )	P
Wild carrot	( <i>Daucus carota</i> )	B
Wild lettuce	( <i>Lactuca spp.</i> )	A/B
Wild parsnip	( <i>Pastinaca sativa</i> )	B

## BROADLEAF WEEDS (continued)

Common Name	Species	Growth Habit <sup>2</sup>
<b>Apply 2 to 3 pints per acre<sup>1</sup> (continued)</b>		
Wild turnip	( <i>Brassica campestris</i> )	B
Woollyleaf bursage	( <i>Franseria tomentosa</i> )	P
Yellow woodsorrel	( <i>Oxalis stricta</i> )	P
<b>Apply 3 to 4 pints per acre<sup>1</sup></b>		
Broom snakeweed <sup>8</sup>	( <i>Gutierrezia sarothrae</i> )	P
Bull thistle	( <i>Cirsium vulgare</i> )	B
Burclover <sup>3</sup>	( <i>Medicago spp.</i> )	A
Chickweed, mouseear <sup>5</sup>	( <i>Cerastium vulgatum</i> )	A
Clover, hop <sup>3</sup>	( <i>Trifolium procumbens</i> )	A
Cocklebur	( <i>Xanthium strumarium</i> )	A
Cudweed <sup>3</sup>	( <i>Gnaphalium spp.</i> )	A
Desert camelthorn	( <i>Alhagi pseudalhagi</i> )	P
Diffuse knapweed	( <i>Centaurea diffusa</i> )	A
Dock	( <i>Rumex spp.</i> )	P
Fiddleneck <sup>3</sup>	( <i>Amsinckia intermedia</i> )	A
Goldenrod	( <i>Solidago spp.</i> )	P
Henbit <sup>3</sup>	( <i>Lamium aplexicaule</i> )	A
Knotweed, prostrate <sup>3</sup>	( <i>Polygonum aviculare</i> )	A/P
Pokeweed	( <i>Phytolacca americana</i> )	P
Purple loosestrife <sup>6</sup>	( <i>Lythrum salicaria</i> )	P
Purslane	( <i>Portulaca spp.</i> )	A
Pusley, Florida <sup>3</sup>	( <i>Richardia scabra</i> )	A
Rocket, London <sup>3</sup>	( <i>Sisymbrium irio</i> )	A
Rush skeletonweed <sup>6</sup>	( <i>Chondrilla juncea</i> )	B
Saltbush	( <i>Atriplex spp.</i> )	A
Shepherdspurse <sup>3</sup>	( <i>Capsella bursa-pastoris</i> )	A
Spurge, annual <sup>3</sup>	( <i>Euphorbia spp.</i> )	A
Stinging nettle <sup>6</sup>	( <i>Urtica dioica</i> )	P
Velvetleaf <sup>3</sup>	( <i>Abutilon theophrasti</i> )	A
Yellow starthistle	( <i>Centaurea solstitialis</i> )	A
<b>Apply 4 to 6 pints per acre<sup>1</sup></b>		
Arrowwood	( <i>Pluchea sericea</i> )	A
Canada thistle	( <i>Cirsium arvense</i> )	P
Giant ragweed	( <i>Ambrosia trifida</i> )	A
Grey rabbitbrush	( <i>Chrysothamnus nauseosus</i> )	P
Japanese bamboo/knotweed	( <i>Polygonum cuspidatum</i> )	P
Little mallow	( <i>Malva parviflora</i> )	B
Milkweed	( <i>Asclepias spp.</i> )	P
Primrose	( <i>Oenothera kunthiana</i> )	P
Russian knapweed	( <i>Centaurea repens</i> )	P
Sago pondweed	( <i>Potamogeton pectinatus</i> )	P
Silverleaf nightshade	( <i>Solanum elaeagnifolium</i> )	P
Sowthistle	( <i>Sonchus spp.</i> )	A
Texas thistle	( <i>Cirsium texanum</i> )	P

## VINES AND BRAMBLES

Common Name	Species	Growth Habit <sup>2</sup>
<b>Apply 1 pint per acre</b>		
Field bindweed	( <i>Convolvulus arvensis</i> )	P
Hedge bindweed	( <i>Calystegia sepium</i> )	A
<b>Apply 2 to 3 pints per acre<sup>1</sup></b>		
Wild buckwheat	( <i>Polygonum convolvulus</i> )	P
<b>Apply 3 to 4 pints per acre<sup>1</sup></b>		
Greenbriar	( <i>Smilax spp.</i> )	P
Honeysuckle	( <i>Lonicera spp.</i> )	P
Morningglory	( <i>Ipomoea spp.</i> )	A/P
Poison ivy	( <i>Rhus radicans</i> )	P
Redvine	( <i>Brunnichia cirrhosa</i> )	P
Wild rose	( <i>Rosa spp.</i> )	P
including: Multiflora rose	( <i>Rosa multiflora</i> )	P
Macartney rose	( <i>Rosa bracteata</i> )	P
<b>Apply 4 to 6 pints per acre<sup>1</sup></b>		
Kudzu <sup>4</sup>	( <i>Pueraria lobata</i> )	P
Trumpetcreeper	( <i>Campsis radicans</i> )	P
Virginia creeper	( <i>Parthenocissus quinquefolia</i> )	P
Wild grape	( <i>Vitis spp.</i> )	P

## BRUSH SPECIES

**Apply 4 to 6 pints per acre<sup>1</sup>**

American beech	( <i>Fagus grandifolia</i> )	P
Ash	( <i>Fraxinus spp.</i> )	P
Bald cypress	( <i>Taxodium distichum</i> )	P
Bigleaf maple	( <i>Acer macrophyllum</i> )	P
Blackgum	( <i>Nyssa sylvatica</i> )	P
Black locust <sup>7</sup>	( <i>Robinia pseudoacacia</i> )	P
Boxelder	( <i>Acer negundo</i> )	P
Brazilian peppertree	( <i>Schinus terebinthifolius</i> )	P
Cherry	( <i>Prunus spp.</i> )	P
Chinaberry	( <i>Melia azadarach</i> )	P
Chinese tallow-tree	( <i>Sapium sebiferum</i> )	P
Dogwood	( <i>Cornus spp.</i> )	P
Elm <sup>8</sup>	( <i>Ulmus spp.</i> )	P
Hawthorn	( <i>Crataegus spp.</i> )	P
Hickory	( <i>Carya spp.</i> )	P
Honeylocust <sup>9</sup>	( <i>Gleditsia triacanthos</i> )	P
Maple	( <i>Acer spp.</i> )	P
Melaleuca	( <i>Melaleuca quinquenervia</i> )	P
Mulberry	( <i>Morus spp.</i> )	P
Oak	( <i>Quercus spp.</i> )	P
Persimmon	( <i>Diospyros virginiana</i> )	P
Poplar	( <i>Populus spp.</i> )	P
Privet	( <i>Ligustrum vulgare</i> )	P
Red alder	( <i>Alnus rubra</i> )	P
Red maple	( <i>Acer rubrum</i> )	P
Russian olive	( <i>Eleagnus angustifolia</i> )	P
Saltcedar	( <i>Tamarix ramosissima</i> )	P
Sassafras	( <i>Sassafras albidum</i> )	P

## BRUSH SPECIES (continued)

Apply 4 to 6 pints per acre<sup>1</sup> (continued)

Common Name	Species	Growth Habit <sup>2</sup>
Sourwood	( <i>Oxydendrum arboreum</i> )	P
Sumac	( <i>Rhus spp.</i> )	P
Sweetgum	( <i>Liquidambar styraciflua</i> )	P
Willow	( <i>Salix spp.</i> )	P
Yellow poplar	( <i>Liriodendron tulipifera</i> )	P

<sup>1</sup> The higher rates should be used where heavy or well-established infestations occur.

<sup>2</sup> Growth Habit: A = Annual, B = Biennial, P = Perennial

<sup>3</sup> For preemergence control, tank mix with **Pendulum® herbicide**.

<sup>4</sup> Use a minimum of 75 GPA; control of established stands may require repeat applications.

<sup>5</sup> For preemergence control, tank mix with **Karmex®**, **Pendulum**, or diuron.

<sup>6</sup> For best results, early postemergence applications are required.

<sup>7</sup> Tank mix with **Accord®**, **Escort®**, **Garlon® 3A**, **Krenite®**, **Roundup®**, or **Tordon® K**.

<sup>8</sup> Tank mix with **Accord**, **Escort**, or **Roundup**.

<sup>9</sup> Tank mix with **Accord**, **Garlon 3A**, **Roundup**, or **Tordon K**.

## **Conditions of Sale and Warranty**

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and must be followed carefully. However, it is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF CORPORATION ("BASF") or the Seller. To the extent consistent with applicable law, all such risks shall be assumed by the Buyer.

BASF warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks, referred to above.

**TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BASF MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.**

**TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BUYER'S EXCLUSIVE REMEDY AND BASF'S EXCLUSIVE LIABILITY, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE, SHALL BE LIMITED TO REPAYMENT OF THE PURCHASE PRICE OF THE PRODUCT.**

**TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, BASF AND THE SELLER DISCLAIM ANY LIABILITY FOR CONSEQUENTIAL, EXEMPLARY, SPECIAL OR INDIRECT DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.**

BASF and the Seller offer this product, and the Buyer and User accept it, subject to the foregoing **Conditions of Sale and Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of BASF.

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Supersedes: NVA 2007-04-295-0100

BASF Corporation  
26 Davis Drive  
Research Triangle Park, NC 27709

**BASF**  
The Chemical Company

# Specimen Label

Dow AgroSciences

# Milestone<sup>TM</sup>

## Specialty Herbicide

<sup>TM</sup>Trademark of Dow AgroSciences LLC

- For control of susceptible broadleaf weeds, including invasive and noxious weeds, on rangeland, permanent grass pastures, Conservation Reserve Program (CRP) acres, non-cropland areas (such as roadsides), non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites.

GROUP	4	HERBICIDE
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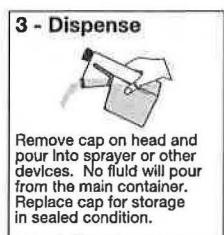
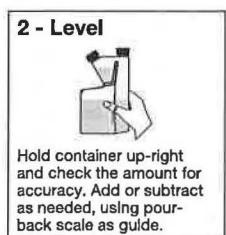
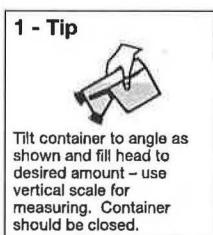
### Active Ingredient:

aminopyralid: 2-pyridine carboxylic acid, 4-amino-3,6-dichloro-2-pyridinecarboxylic acid,	
triisopropanol ammonium salt of aminopyralid.....	40.6%
Inert Ingredients .....	59.4%
Total.....	100.0%

Acid Equivalent: aminopyralid (4-amino-3,6-dichloropyridine-2-carboxylic acid) - 21.1% - 2 lb/gal

EPA Reg. No. 62719-519

### Container Use Directions



### Keep Out of Reach of Children CAUTION

#### Precautionary Statements

#### Hazard to Humans and Domestic Animals

Causes Moderate Eye Irritation

Avoid contact with eyes or clothing.

#### Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

#### First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

#### Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

**Notice:** Read the entire label. Use only according to label directions. Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies elsewhere on this label. If terms are unacceptable, return at once unopened.

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at [www.dowagro.com](http://www.dowagro.com).

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

#### Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

### Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about Personal Protective Equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material as polyethylene or polyvinyl chloride
- Shoes plus socks

### Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS does not pertain to non-agricultural use on sites, such as, rangeland, permanent grass pastures, or non-cropland. See the Agricultural Use Requirements section below for information where the WPS applies.

**Entry Restrictions for Non-WPS Uses:** For applications on rangeland and permanent grass pastures (not harvested for hay) and non-cropland areas, do not enter or allow worker entry into treated areas until sprays have dried.

### Storage and Disposal

Do not contaminate water, food, feed or fertilizer by storage or disposal. Open dumping is prohibited.

**Pesticide Storage:** If this product is exposed to subfreezing temperatures, the active ingredient may crystallize and settle out of solution. Under these conditions the product should be warmed to at least 40°F and agitated well to dissolve any crystallized active ingredient prior to use.

**Pesticide Disposal:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal (Metal):** Do not reuse container. Triple rinse (or equivalent). Puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

**Container Disposal (Plastic):** Do not reuse container. Triple rinse (or equivalent). Puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

**General:** Consult federal, state or local disposal authorities for approved alternative procedures.

### Resistance Management Guidelines

- Development of plant populations resistant to this herbicide mode of action is usually not a problem on rangeland, permanent grass pastures, Conservation Reserve Program (CRP), or non-cropland sites since these sites receive infrequent pesticide applications.
- Similar looking biotypes of a given weed species occurring in a treated area may vary in their susceptibility to a herbicide. Application of a herbicide below its recommended rate may allow more tolerant weeds to survive and a shift to more tolerant biotypes within the treated area.
- Where identified, spreading of resistant weeds to other fields may be prevented by cleaning harvesting and tillage equipment before moving to other areas and by planting weed-free seed.
- Contact your extension specialist, certified crop consultant, or Dow AgroSciences representative for the latest resistance management information.

### Rangeland, Permanent Grass Pastures and Non-Cropland Areas

Milestone™ specialty herbicide controls susceptible broadleaf weeds, including invasive and noxious weeds on rangeland, permanent grass pastures, CRP acres, non-cropland areas (such as roadsides), non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites without injury to most grasses.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs) and transitional areas between upland and lowland sites.

### Use Precautions and Restrictions

- **Avoiding Injury to Non-Target Plants:** Do not aerially apply Milestone within 50 feet of a border downwind (in the direction of wind movement), or allow spray drift to come in contact with, any broadleaf crop or other desirable broadleaf plants, including, but not limited to, alfalfa, cotton, dry beans, flowers, grapes, lettuce, potatoes, radishes, soybeans, sugar beets, sunflowers, tobacco, tomatoes or other broadleaf or vegetable crop, fruit trees, ornamental plants, or soil where sensitive crops are growing or will be planted. Avoid application under conditions that may allow spray drift because very small quantities of spray may seriously injure susceptible crops. Follow Precautions for Avoiding Spray Drift and Spray Drift Advisory under General Mixing and Application Instructions to minimize the potential for spray drift.
- **Milestone is highly active against broadleaf plants.** Do not use this product on areas where loss of broadleaf plants, including legumes, cannot be tolerated.
- **Chemigation:** Do not apply this product through any type of irrigation system.
- **Do not contaminate water intended for irrigation or domestic purposes.** Do not treat inside banks or bottoms of irrigation ditches, either dry or containing water, or other channels that carry water that may be used for irrigation or domestic purposes.
- **Crop Rotation:** Do not rotate to any crop from rangeland, permanent pasture or CRP acres within one year following treatment. Do not plant a broadleaf crop until an adequately sensitive field bioassay shows that the level of aminopyralid present in the soil will not adversely affect that broadleaf crop.

- Seeding Legumes:** Do not plant forage legumes until a soil bioassay has been conducted to determine if aminopyralid concentration remaining in the soil will adversely affect the legume establishment.
- Field Bioassay Instructions:** In fields previously treated with this product, plant short test rows of the intended rotational crop across the original direction of application in a manner to sample variability in field conditions such as soil texture, soil organic matter, soil pH, rainfall pattern or drainage. The field bioassay can be initiated at any time between harvest of the treated crop and the planting of the intended rotational crop. Observe the test crop for symptoms of herbicidal activity, such as poor stand (effect on seed germination), chlorosis (yellowing), and necrosis (dead leaves or shoots), or stunting (reduced growth). If herbicidal symptoms do not occur, the test crop can be grown. If there is apparent herbicidal activity, do not plant the field to the intended rotational crop; plant only to a labeled crop.
- Aminopyralid in Plant Residues or Manure:**
  - Do not use aminopyralid-treated plant residues, including hay or straw from treated areas, or manure from animals that have grazed forage or hay harvested from treated areas within the previous 3 days, in compost or mulch that will be applied to areas where susceptible broadleaf plants may be grown.
  - Do not spread manure from animals that have grazed or consumed forage or hay from treated areas within the previous 3 days on land used for growing susceptible broadleaf crops.
  - Manure from animals that have grazed forage or hay harvested from aminopyralid-treated areas within the previous 3 days may only be used on pasture grasses, grass grown for seed, and wheat.
  - Do not plant a broadleaf crop in fields treated in the previous year with manure from animals that have grazed forage or hay harvested from aminopyralid-treated areas until an adequately sensitive field bioassay is conducted to determine that the aminopyralid concentration in the soil is at level that is not injurious to the crop to be planted.
  - To promote herbicide decomposition, plant residues should be evenly incorporated in the surface soil or burned. Breakdown of aminopyralid in plant residues or manure is more rapid under warm, moist soil conditions and may be enhanced by supplemental irrigation.
- Grazing and Haying Restrictions:** There are no restrictions on grazing or hay harvest following application of Milestone at labeled rates. Do not transfer grazing animals from areas treated with Milestone to areas where sensitive broadleaf crops occur without first allowing 3 days of grazing on an untreated pasture. Otherwise, urine and manure may contain enough aminopyralid to cause injury to sensitive broadleaf plants.
- Maximum Application Rate:** On rangeland, permanent grass pastures, CRP acres, and non-cropland areas, do not apply more than 7 fl oz (0.11 lb acid equivalent) per acre of Milestone per year. The total amount of Milestone applied broadcast, as a re-treatment, and/or spot treatment per year, cannot exceed 7 fl oz per acre.

## Application Methods

### (Broadcast Equipment)

**Ground Broadcast Application:** Apply the recommended rate of Milestone as a coarse low-pressure spray. Spray volume should be sufficient to uniformly cover foliage. Increase spray volume to ensure thorough and uniform coverage when target vegetation is tall and/or dense. Higher volumes (greater than 10 gallons per acre) generally provide better coverage and better control, particularly in dense and/or tall foliage canopies situations. To enhance foliage wetting and coverage, an approved non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer.

Do not apply this product with mist blower systems that deliver very fine spray droplets. Use of mist blower equipment can reduce control achieved with the herbicide and increase spray drift potential.

**Aerial Broadcast Application:** Apply the recommended rate of Milestone as a coarse low-pressure spray. Spray volume should be sufficient to uniformly cover foliage. Increase spray volume to ensure thorough and uniform coverage when target vegetation is tall and/or dense. Spray volumes greater than 2 gallons per acre generally provide better coverage and better control, particularly when the foliage canopy is dense and/or tall. To enhance foliage wetting and coverage, an approved non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer.

### (Hand-Held Equipment)

**High-Volume Foliar Application:** High volume foliar treatments may be applied at rates equivalent to broadcast up to a maximum of 7 fl oz per acre per annual growing season. Use sufficient spray volume to thoroughly and uniformly wet foliage and stems. To ensure thorough wetting of high volume treatments, a high quality non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer. Repeat treatments may be made, but the total amount of Milestone applied must not exceed 7 fl oz per acre per year.

**Spot Application:** Spot treatments may be applied at rates equivalent to broadcast-applied rate of up to a maximum of 7 fl oz per acre per annual growing season. Spray volume should be sufficient to thoroughly and uniformly wet weed foliage. Use of a high quality non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer. Repeat treatments may be made, but the total amount of Milestone applied must not exceed 7 fl oz per acre per year. To prevent misapplication, spot treatments should be applied with a calibrated boom, boomless spray system, hand-held, or backpack sprayers.

Spot treatments may be applied at an equivalent broadcast rate of up to 0.22 lb active ingredient (14 fl oz of Milestone) per acre per annual growing season; however, not more than 50% of an acre may be treated. Do not apply more than a total of 0.11 lb active ingredient (7 fl oz per acre of Milestone) per annual growing season as a result of broadcast, spot or repeat applications.

Application rates in the table below are based on treating an area of 1000 sq ft. An area of 1000 sq ft is about 10.5 by 10.5 yards in size. Mix the amount of Milestone (fl oz or milliliters) corresponding to the desired broadcast rate in 0.5 to 2.5 gallons of water, depending upon the spray volume required to treat 1000 sq ft. A delivery volume of 0.5 to 2.5 gallons per 1000 sq ft is equivalent to 22 to 109 gallons per acre.

Amount of Milestone per 1000 sq ft to Equal Broadcast Rate		
Broadcast Rate (fl oz/acre)	Amount of Milestone per 1000 sq ft (fl oz)	Amount of Milestone per 1000 sq ft (Milliliters)
3	0.069	2
5	0.115	3.4
7	0.161	4.8

**Note:** 1 fluid ounce (fl oz) = 29.6 milliliters (ml) = 2 tablespoons = 6 teaspoons

**To calculate the amount of Milestone for areas larger than 1000 sq ft:** Multiply the table value (fl oz or milliliters) by the area to be treated in "thousands" of square feet. For example, if the area to be treated is 3500 sq ft, multiply the table value by 3.5 (3500 sq ft divided by 1000 sq ft = 3.5).

### Broadleaf Weed Control

#### Rangeland, Permanent Grass Pastures and CRP Acres

Milestone may be applied to rangeland, permanent pasture or CRP acres seeded to permanent grasses as an aerial or ground broadcast treatment, as a spot application, or as a high volume foliar application (see Application Methods section) to control susceptible broadleaf weeds, including invasive and noxious weeds (see Broadleaf Weeds Controlled section). Milestone may be applied alone or in tank mix combinations with labeled rates of other herbicides provided: (1) the tank mix product is labeled for the timing and method of application for the use site to be treated and (2) mixing is not prohibited by the label of the registered tank mixed products. When tank mixing, use only in accordance with the most restrictive precautions and limitations on the respective product labels. Follow Mixing Instructions under the General Mixing and Application Instructions section.

**Do not use Milestone if loss of legumes species or other broadleaf species cannot be tolerated.**

During the season of establishment, Milestone should be applied only after perennial grasses are well established (have developed a good secondary root system and show good vigor). Most perennial grasses are tolerant to Milestone at this stage of development.

Milestone may suppress certain established grasses, such as smooth bromegrass (*Bromus inermis*), especially when plants are stressed by adverse environmental conditions. Plants should recover from this transient suppression with the onset of environmental conditions favorable to grass growth and upon release from weed competition.

### Non-Cropland Areas

Milestone may be applied to non-cropland areas as an aerial or ground broadcast treatment, as a spot application, or as a high volume foliar application (see Application Methods section). Milestone may be applied alone or in tank mix combinations with labeled rates of other herbicides provided: (1) the tank mix product is labeled for the timing and method of application for the use site to be treated and (2) mixing is not prohibited by the label of the registered tank mixed products. When tank mixing, use only in accordance with the most restrictive precautions and limitations on the respective product labels. Follow Mixing Instructions under the General Mixing and Application Instructions section.

Milestone, alone or in tank mix combination, is recommended for control of susceptible broadleaf weeds, including invasive and noxious weeds (see Broadleaf Weeds Controlled section) on non-cropland areas (such as roadsides), non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites and where these non-cropland sites cross rangeland and pastures or other grazed areas.

### Broadleaf Weed Management Practices

Milestone may be applied postemergence as a broadcast spray or as a spot application to control broadleaf weeds including, but not limited to, those listed on this label. Postemergence applications should be made before bud stage or early flowering, unless otherwise specified. When a rate range is given, use a higher rate in the range to control weeds at advanced growth stages or under less than favorable growing conditions (e.g., drought stress). Best weed control results are obtained when spray volume is sufficient to provide uniform coverage of treated plants. For optimum uptake and translocation of the herbicide, avoid mowing, haying, shredding, burning or soil disturbance in treated areas for at least 7 days following application.

Milestone also provides preemergence control of germinating seeds or emerging seedlings of susceptible broadleaf weeds following application. Preventing establishment of susceptible weeds will depend upon application rate, season of application, and growing condition effects after application on weed seed germination and seedling emergence.

Milestone can provide long-term control of susceptible weeds. The length of control is dependent upon the application rate, condition and growth stage of target weeds, environmental conditions at and following application, and the density and vigor of competing desirable vegetation. Long-term broadleaf weed control is most effective where grass vegetation is allowed to recover from overgrazing, drought, etc., and compete with broadleaf weeds.

Milestone can be an important component of integrated vegetation management programs designed to renovate or restore desired plant communities. To maximize and extend the benefits of weed control provided by Milestone, it is important that other vegetation management practices, including proper grazing management, fertilization, prescribed fire, etc., be used in appropriate sequences and combinations to further alleviate the adverse effects of weeds on desirable plant species and to promote development of desired plant communities. Agricultural and natural resources specialists with federal and state government agencies can provide guidance on best management practices and development of integrated vegetation management programs.

## Broadleaf Weeds Controlled

The following weeds will be controlled with the rates of Milestone indicated in the table. For best results, most weeds should be treated when they are actively growing and under conditions favorable for growth. Use a higher rate in the rate range when growing conditions are less than favorable or when weed foliage is tall and dense. Milestone also provides preemergence control of germinating seeds and control of emerged seedlings of susceptible broadleaf weeds following application.

**Note:** Numbers in parentheses (-) refer to specific use directions for a particular weeds species.

Common Name	Scientific Name	Rate Range (fl oz/acre)	Life Cycle	Plant Family
amaranth, spiny	<i>Amaranthus spinosus</i>	4 to 7	annual	Amaranthaceae
broomweed, annual	<i>Amphiachyris dracunculoides</i>	4 to 7	annual	Asteraceae
burdock, common*, **	<i>Arctium minus</i>	4 to 6	biennial	Asteraceae
buttercup, hairy*	<i>Ranunculus sardous</i>	4 to 6	annual	Ranunculaceae
buttercup, tall*, **	<i>Ranunculus acris</i>	4 to 6	perennial	Ranunculaceae
chicory*	<i>Cichorium intybus</i>	4 to 6	perennial	Asteraceae
cinquefoil, sulfur (1)*, **	<i>Potentilla recta</i>	4 to 6	perennial	Rosaceae
cocklebur	<i>Xanthium strumarium</i>	3 to 5	annual	Asteraceae
croton, tropic	<i>Croton glandulosus</i>	3 to 5	annual	Euphorbiaceae
cudweed, purple	<i>Gamochaeta purpurea</i>	4 to 6	annual	Asteraceae
daisy, oxeye (1)*, **	<i>Leucanthemum vulgare</i>	4 to 6	perennial	Asteraceae
dock, curly*	<i>Rumex crispus</i>	4 to 6	perennial	Polygonaceae
evening primrose, cutleaf	<i>Oenothera lacinata</i>	4 to 7	annual	Onagraceae
fiddleneck, common	<i>Amsinckia intermedia</i>	7	annual	Boraginaceae
fireweed	<i>Epilobium angustifolium</i>	5 to 7	perennial	Onagraceae
fleabane, flax-leaf	<i>Conyza bonariensis</i>	4 to 7	annual	Asteraceae
hawkweed, orange (2)*, **	<i>Hieracium aurantiacum</i>	4 to 6	perennial	Asteraceae
hawkweed, yellow (2)*, **	<i>Hieracium caespitosum</i>	4 to 6	perennial	Asteraceae
henbit*	<i>Lamium amplexicaule</i>	4 to 6	annual/biennial	Lamiaceae
horsenettle, Carolina**	<i>Solanum carolinense</i>	4 to 7	perennial	Solanaceae
horseweed	<i>Conyza canadensis</i>	4 to 6	annual	Asteraceae
ironweed, tall	<i>Vernonia gigantea</i>	5 to 7	perennial	Asteraceae
ironweed, western	<i>Vernonia baldwinii</i>	7	perennial	Asteraceae
knapweed, diffuse (3)*, **	<i>Centaurea diffusa</i>	5 to 7	biennial/perennial	Asteraceae
knapweed, Russian (4)*, **	<i>Acroptilon repens</i>	4 to 6	perennial	Asteraceae
knapweed, spotted (3)*, **	<i>Centaurea stoebe</i>	5 to 7	biennial/perennial	Asteraceae
kudzu*, **	<i>Pueraria montana</i>	7	perennial	Fabaceae
lady's thumb*	<i>Polygonum persicaria</i>	3 to 5	annual	Polygonaceae
lambsquarters	<i>Chenopodium album</i>	5 to 7	annual	Chenopodiaceae
marshelder, annual	<i>Iva annua</i>	7	annual	Asteraceae
mayweed, scentless*	<i>Tripleurospermum perforata</i>	4 to 6	annual	Asteraceae
mayweed, stinking*, **	<i>Anthemis cotula</i>	7	annual	Asteraceae
medic, black*	<i>Medicago lupulina</i>	4 to 6	perennial	Fabaceae
ragweed, common**	<i>Ambrosia artemisiifolia</i>	3 to 5	annual	Asteraceae
ragweed, western	<i>Ambrosia psilostachya</i>	4 to 7	perennial	Asteraceae
ragwort, tansy*, **	<i>Senecio jacobaea</i>	4 to 5	perennial	Asteraceae
smartweed, Pennsylvania	<i>Polygonum pensylvanicum</i>	3 to 5	annual	Polygonaceae
sneezeweed, bitter	<i>Helenium amarum</i>	4 to 6	annual	Asteraceae

\*Invasive plants are introduced species that are indicated to be invasive in the USDA-NRCS, PLANTS Database (<http://plants.usda.gov/index.html>).

\*\*Plants designated as noxious weeds in at least one state (PLANTS Database, USDA-NRCS, <http://plants.usda.gov/index.html>).

- (1) **Sulfur cinquefoil or oxeye daisy:** Apply Milestone at 4 to 6 fl oz per acre to plants in the prebud stage of development.
- (2) **Orange or yellow hawkweeds:** Apply Milestone at 4 to 6 fl oz per acre to plants in the bolting stage of development.
- (3) **Diffuse and spotted knapweeds:** Apply Milestone at 5 to 7 fl oz per acre when plants are actively growing with the optimum time of application occurring from rosette to the bolting stages of development or in the fall.
- (4) **Russian knapweed:** Apply Milestone at 4 to 6 fl oz per acre to plants in the spring and summer that are in the bud to flowering stage and to dormant plants in the fall.

Common Name	Scientific Name	Rate Range (fl oz/acre)	Life Cycle	Plant Family
soda apple, tropical (5)*, **	<i>Solanum viarum</i>	5 to 7	perennial	Solanaceae
sowthistle, perennial*, **	<i>Sonchus arvensis</i>	3 to 5	perennial	Asteraceae
star thistle, yellow (6)*, **	<i>Centaurea solstitialis</i>	3 to 5	annual	Asteraceae
sunflower, common	<i>Helianthus annuus</i>	4 to 6	annual	Asteraceae
teasel, fuller's*	<i>Dipsacus sativus</i>	4 to 7	biennial	Dipsacaceae
thistle, bull (7)*, **	<i>Cirsium vulgare</i>	3 to 5	biennial	Asteraceae
thistle, Canada (8)*, **	<i>Cirsium arvense</i>	5 to 7	perennial	Asteraceae
thistle, musk (7)*, **	<i>Carduus nutans</i>	3 to 5	biennial	Asteraceae
thistle, plumeless (7)*, **	<i>Carduus acanthoides</i>	3 to 5	biennial	Asteraceae
wormwood, absinth*, **	<i>Artemisia absinthium</i>	6 to 7	perennial	Asteraceae
yarrow, common	<i>Achillea millefolium</i>	7	perennial	Asteraceae

\*Invasive plants are introduced species that are indicated to be invasive in the USDA-NRCS, PLANTS Database (<http://plants.usda.gov/index.html>).

\*\*Plants designated as noxious weeds in at least one state (PLANTS Database, USDA-NRCS, <http://plants.usda.gov/index.html>).

- (5) **Tropical soda apple:** Apply Milestone at 5 to 7 fl oz per acre at any growth stage, but application by flowering will reduce seed production potential.
- (6) **Yellow starthistle:** Apply Milestone at 3 to 5 fl oz per acre to plants at the rosette through bolting growth stages.
- (7) **Bull, musk and plumeless thistles:** Apply Milestone at 3 to 5 fl oz per acre in the spring and early summer to rosette or bolting plants or in the fall to seedlings and rosettes. Apply at 4 to 5 fl oz when plants are at the late bolt through early flowering growth stages.
- (8) **Canada thistle:** Apply Milestone at 5 to 7 fl oz per acre either in the spring to plants in the prebud growth stage or in the fall to plant regrowth.

## General Mixing and Application Instructions

### Mixing Instructions

**Mixing with Water:** To prepare the spray, add about half the required amount of water in the spray tank. Then, with agitation, add the recommended amount of Milestone and other registered tank mix herbicides. Finally, with continued agitation, add the rest of the water and additives such as surfactants or drift control and deposition aids.

**Tank Mixing with Other Herbicides:** Milestone at rates of up to 7 fl oz per acre may be mixed with labeled rates of other herbicides registered for application on rangeland, permanent grass pastures, CRP acres, and non-cropland areas to broaden the spectrum of weeds controlled or to improve control of certain weeds. Milestone may be applied in tank mix combination with labeled rates of other herbicides provided: (1) the tank mix product is labeled for the timing and method of application for the use site to be treated and (2) mixing is not prohibited by the label of the registered tank mixed products. When tank mixing, use only in accordance with the most restrictive precautions and limitations on the respective product labels.

- Read carefully and follow all applicable use directions, precautions, and limitations on the respective product labels.
- Do not exceed recommended application rates. If products containing the same active ingredient are mixed, do not exceed the maximum allowable active ingredient use rates.
- For direct injection or other spray equipment where the product formulations will be mixed in undiluted form, special care should be taken to ensure tank mix compatibility.
- Always perform a jar test to ensure the compatibility of products to be used in tank mixture.

**Tank Mix Compatibility Testing:** A jar test is recommended prior to mixing in a spray tank to ensure compatibility of Milestone and other pesticides or carriers. Use a clear glass jar with lid and mix ingredients in the same order and proportions as will be used in the spray tank.

The mixture is compatible if the materials mix readily when the jar is inverted several times. The mixture should remain stable after standing for 1/2 hour or, if separation occurs, should readily remix if agitated. An incompatible mixture is indicated by separation into distinct layers that do not readily remix when agitated and/or the presence of flakes, precipitates, gels, or heavy oily film in the jar. Use of an appropriate compatibility aid such as Unite or Complex may resolve mix incompatibility. If the mixture is incompatible do not use that tank mix partner in tank mixtures.

**Use with Surfactants on Rangeland, Permanent Grass Pastures and CRP Acres:** The addition of a high quality non-ionic surfactant at 0.25 to 0.5 % volume per volume (1 to 2 quarts per 100 gallons of spray) is recommended to enhance herbicide activity under adverse environmental conditions (such as, high temperature, low relative humidity, drought conditions, dusty plant surfaces) or when weeds are heavily pubescent or more mature.

**Mixing with Sprayable Liquid Fertilizer Solutions:** Milestone is usually compatible with liquid fertilizer solutions. It is anticipated that Milestone will not require a compatibility agent for mixing with fertilizers; however, a compatibility test (jar test) should be made prior to mixing. Jar tests are particularly important when a new batch of fertilizer or pesticide is used, when water sources change, or when tank mixture ingredients or concentrations are changed. Compatibility may be determined by mixing the spray components in the desired order and proportions in a clear glass jar before large scale mixing of spray components in the spray tank. **Note:** The lower the temperature of the liquid fertilizer, the greater the likelihood of mixing problems. Use of a compatibility aid may be required if Milestone is mixed with a 2,4-D-containing product and liquid fertilizer. **Mixing Milestone and 2,4-D in N-P or N-P-K liquid fertilizer solutions is more difficult than mixing with straight nitrogen fertilizer and should not be attempted without first conducting a successful compatibility jar test.** Agitation in the spray tank must be vigorous to be comparable with jar test agitation. Apply the spray mixture the same day it is prepared while maintaining continuous agitation. Rinse the spray tank thoroughly after use.

**Note:** Foliar-applied liquid fertilizers used as carrier for Milestone can cause yellowing of the foliage of forage grasses and other vegetation.

#### Sprayer Clean-Out Instructions

Do not use spray equipment used to apply Milestone for other applications to land planted to, or to be planted to, susceptible crops or desirable sensitive plants unless it has been determined that all residues of this herbicide has been removed by thorough cleaning of equipment.

Equipment used to apply Milestone should be thoroughly cleaned before reusing to apply any other chemicals as follows:

1. Rinse and flush application equipment thoroughly after use. Dispose of rinse water in non-cropland area away from water supplies.
2. Rinse a second time, adding 1 quart of household ammonia or tank cleaning agent for every 25 gallons of water. Circulate the solution through the entire system so that all internal surfaces are contacted (15 to 20 minutes). Let the solution stand for several hours, preferably overnight.
3. Flush the solution out of the spray tank through the boom.
4. Rinse the system twice with clean water, recirculating and draining each time.
5. Spray nozzles and screens should be removed and cleaned separately.

#### Precautions for Avoiding Spray Drift

Avoid application under conditions that may allow spray drift because very small quantities of spray, which may not be visible, may injure susceptible crops. This product should be applied only when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, non-target crops and other plants) is minimal (e.g., when wind is blowing away from the sensitive areas. A drift control aid may be added to the spray solution to further reduce the potential for drift. If a drift control aid is used, follow the use directions and precautions on the manufacturer's label. Do not use a thickening agent with Microfoil, Thru-Valve booms, or other spray delivery systems that cannot accommodate thickened spray solutions.

**Ground Equipment:** With ground equipment spray drift can be lessened by keeping the spray boom as low as possible; by applying 10 gallons or more of spray per acre; by keeping the operating spray pressures at the manufacturer's recommended minimum pressures for the specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when the wind velocity is low (follow state regulations). Avoid calm conditions which may be conducive to thermal inversions. Direct sprays no higher than the tops of target vegetation and keep spray pressures low enough to provide coarse spray droplets to minimize drift.

**Aerial Application:** Avoid spray drift at the application site. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. Users are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most operating nozzles on the boom must not exceed 75% of wingspan or 90% of rotor diameter.
2. Nozzles should be pointed backward parallel with the air stream or not pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following **Aerial Drift Reduction Advisory**. This information is advisory in nature and does not supersede mandatory label requirements.

#### Aerial Drift Reduction Advisory

**Information on Droplet Size:** The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

##### Controlling Droplet Size:

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that will provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is released parallel to the airstream produced larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

**Boom Length:** For some use patterns, reducing the effective boom length to less than 90% of the wingspan or rotor length may further reduce drift without reducing swath width.

**Application Height:** Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

**Swath Adjustment:** When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

**Wind:** Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

**Temperature and Humidity:** When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

**Temperature Inversions:** Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

### **Terms and Conditions of Use**

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies.

### **Warranty Disclaimer**

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

### **Inherent Risks of Use**

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

### **Limitation of Remedies**

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

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**Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.**

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**FOR WEED CONTROL, NATIVE GRASS ESTABLISHMENT AND TURF GROWTH  
SUPPRESSION ON PASTURES, RANGELAND AND NONCROP AREAS AND  
CONIFER PLANTATION SITE PREPARATION**

**Active Ingredient:**

Ammonium salt of imazapic ( $\pm$ )-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid\* ..... 23.6%

**Other Ingredients:** ..... 76.4%

**Total:** ..... 100.0%

\*Equivalent to 22.2% ( $\pm$ )-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid  
(1 gallon contains 2.0 pounds of active ingredient as the free acid)

EPA Reg. No. 241-365

EPA Est. No.

U.S. Patent No. 4,798,619

**KEEP OUT OF REACH OF CHILDREN  
CAUTION/PRECAUCION**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.  
(If you do not understand the label, find someone to explain it to you in detail.)

See inside for complete **First Aid, Precautionary Statements, Directions for Use, Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product,  
call day or night 1-800-832-HELP (4357).

**Net Contents:**

BASF Corporation  
26 Davis Drive  
Research Triangle Park, NC 27709

**BASF**  
The Chemical Company

## FIRST AID

If inhaled	<ul style="list-style-type: none"><li>Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.</li><li>Call a poison control center or doctor for further treatment advice.</li></ul>
If on skin or clothing	<ul style="list-style-type: none"><li>Take off contaminated clothing.</li><li>Rinse skin immediately with plenty of water for 15-20 minutes.</li><li>Call a poison control center or doctor for treatment advice.</li></ul>
If in eyes	<ul style="list-style-type: none"><li>Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li><li>Remove contact lenses, if present, after the first 5 minutes, then continue rinsing.</li><li>Call a poison control center for treatment advice.</li></ul>

## HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor or going for treatment.  
You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357).

## PRECAUTIONARY STATEMENTS

### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

# CAUTION

Avoid breathing spray mist. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling.

#### Personal Protective Equipment (PPE):

Applicators and other handlers must wear:

- Long-sleeve shirt and long pants
- Chemical-resistant gloves made of waterproof material
- shoes plus socks

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### User Safety Recommendations:

Users Should:

- Wash hands before eating, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

## ENVIRONMENTAL HAZARDS

For terrestrial use only. **DO NOT** apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark.

**DO NOT** contaminate water when disposing of equipment washwaters or rinsate.

This chemical demonstrates the properties and characteristics associated with chemicals detected in ground water. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

This product may contaminate water through drift of spray in wind. This product has a high potential for runoff for several months or more after application. Poorly draining soils and soils with shallow watertables are more prone to produce runoff that contains this product. A level, well maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential for contamination of water from rainfall-runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

## IMPORTANT

**Plateau® herbicide** may be applied to non-irrigation ditches and low lying areas when water has drained, but may be isolated in pockets due to uneven or unlevel conditions. **DO NOT** treat the inside of irrigation ditches. **DO NOT** rinse equipment on or near desirable trees or ornamental plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. **DO NOT** use on residential lawns.

## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**DO NOT** apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

This labeling must be in the possession of the user at the time of pesticide application.

**DO NOT** use **Plateau** on food or feed crops except as recommended by this label or supplemental labeling.

**DO NOT** cut treated area for hay within seven days after treatment.

**DO NOT** use organophosphate insecticides on newly seeded areas treated with **Plateau** unless severe injury or loss of stand can be tolerated.

Observe all cautions and limitations on this label and on the labels of products used in combination with **Plateau**. **DO NOT** use **Plateau** other than in accordance with the instructions set forth on this label. The use of **Plateau** not consistent with this label may result in injury to desired vegetation. Keep containers closed to avoid spills and contamination.

When making new plantings of prairiegrass or wildflowers, carry-over from persistent herbicides such as sulfonyl-urea, imidazolinone, triazine, substituted urea, dinitroaniline, and other herbicides applied the previous year may result in compounded injury or death of desirable vegetation when treated with **Plateau**.

When making applications around desirable trees or ornamental plants, small areas should be tested to determine the tolerance of a particular species to soil and/or foliar applications of **Plateau**. See "TOLERANCE OF TREES AND BRUSH TO **PLATEAU** HERBICIDE" section of this label.

**DO NOT** apply this product through any type of irrigation system.

**DO NOT** exceed 12 ounces of **Plateau** per acre in one year.

## AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

**DO NOT** enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls
- chemical-resistant gloves made of any waterproof material
- shoes plus socks

## NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Noncrop weed control is not within the scope of the Worker Protection Standard. See the GENERAL INFORMATION section of this label for a description of noncrop sites.

**DO NOT** enter treated areas without protective clothing until sprays have dried.

## STORAGE AND DISPOSAL

**DO NOT** contaminate water, food or feed by storage or disposal.

**PESTICIDE STORAGE: KEEP FROM FREEZING.** **DO NOT** store below 20°F.

**PESTICIDE DISPOSAL:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

### CONTAINER DISPOSAL

**Nonrefillable Container.** **DO NOT** reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

**Triple rinse containers small enough to shake (capacity ≤ 5 gallons) as follows:** Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

**Triple rinse containers too large to shake (capacity > 5 gallons) as follows:** Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

**Pressure rinse as follows:** Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

## In Case of Spill

In case of large-scale spillage regarding this product, call:  
CHEMTRAC  
BASF Corporation

1-800-424-9300  
1-800-832-HELP (4357)

## GENERAL INFORMATION

**Plateau® herbicide** is an aqueous solution to be mixed with water and an adjuvant and applied as a spray solution to provide weed control and/or turf height suppression on pastures, rangeland (see "GUIDELINES FOR RANGELAND USE" section), Federal Conservation Reserve Program (CRP) land and noncropland areas including noncropland areas that may be grazed or cut for hay. Examples of noncropland areas include, but are not limited to railroad, utility, pipeline and highway rights-of-way, railroad crossings, utility plant sites, petroleum tank farms, pumping installations, non-agricultural fence rows, storage areas, non-irrigation ditchbanks, prairie sites, airports, industrial turf, golf courses, recreational and non-residential turf and other similar areas. **Plateau** may be used for the release of bermudagrass, bahiagrass, smooth bromegrass, wheatgrass, "wildtype" common Kentucky bluegrass, native prairiegrass, wildflowers, crown vetch, other grasses and certain legumes. **Plateau** can also be used for weed control during the establishment of native prairiegrasses and other grasses (see "REVEGETATION WITH PRAIRIEGRASSES AND OTHER FORAGE GRASSES" section). **Plateau** may also be used for conifer plantation site preparation.

**Plateau** is readily absorbed through leaves, stems, and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis appears first in the newest leaves, and necrosis spreads from this point. In perennials, the herbicide is translocated into, and kills, underground storage organs which prevents regrowth. Chlorosis and tissue necrosis may not be apparent in some plant species for several weeks after application. Complete kill of plants may not occur for several weeks after application. Adequate soil moisture is important for optimum **Plateau** activity. When adequate soil moisture is present, **Plateau** will provide residual control of susceptible germinating weeds. Activity on established weeds will depend on the weed species and rooting depth. **Plateau** is rainfast one hour after application.

**Plateau** will control annual and perennial grasses and broadleaf weeds and vine species. **Plateau** will provide residual control of labeled weeds which germinate in the treated area. Certain brush species and ornamentals may be injured by direct application of **Plateau** to their foliage. This product may be applied either preemergence or postemergence to the weeds. However, postemergence application is the method of choice in most situations, particularly for perennial species. For maximum activity, weeds should be growing vigorously at the time of postemergence applications and the spray solution should include an adjuvant (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section). These solutions may be applied as a broadcast or as a spot treatment using backpack, or ground equipment.

**Plateau** may be applied in the dormant or growing season for weed control.

Tolerance of desirable grass species to **Plateau** may be reduced when grasses are stressed due to insect damage, disease, environmental conditions, shade, poorly drained soils or other causes.

Depending on the turf type being treated, some yellowing of turf may occur with applications during the growing season. Depending on weather conditions, yellowing will usually disappear in 2 to 4 weeks.

**Plateau** should not be applied to newly seeded or sprigged grass stands, unless otherwise stated in this label (see "REVEGETATION WITH PRAIRIEGRASSES AND OTHER FORAGE GRASSES" section).

## MANAGING OFF-TARGET MOVEMENT

**Spray Drift:** Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Spray drift from applying this product may result in damage to sensitive plants adjacent to the treatment area. Only apply this

product when the potential for drift to these and other adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, or non-target crops) is minimal. **DO NOT** apply when the following conditions exist that increase the likelihood of spray drift from intended targets: high or gusty winds, high temperatures, low humidity, temperature inversions.

To minimize spray drift, the applicator should be familiar with and take into account the following drift reduction advisory information. Additional information may be available from state enforcement agencies or the Cooperative Extension on the application of this product.

The best drift management strategy and most effective way to reduce drift potential are to apply large droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see **Wind, Temperature and Humidity and Temperature Inversions**).

### Controlling Droplet Size:

- Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure - **DO NOT** exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- Number of Nozzles - Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is recommended practice. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift. **DO NOT** use nozzles producing a mist droplet spray.

**Application Height:** Making applications at the lowest possible height (aircraft, ground driven spray boom) that is safe and practical reduces exposure of droplets to evaporation and wind.

**Swath Adjustment:** When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the application equipment (e.g. aircraft, ground) upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller droplets, etc.).

**Wind:** Drift potential is lowest between wind speeds of 3-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 3 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

**Temperature and Humidity:** When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

**Temperature Inversions:** Drift potential is high during a temperature inversion. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud, which can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind

conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

**Wind Erosion:** Avoid treating powdery dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

**Aerial Application Methods and Equipment:** Use 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

**Managing spray drift from aerial applications:** Applicators must follow these requirements to avoid off-target drift movement: 1) boom length - the distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor, 2) nozzle orientation - nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees, and 3) application height - without compromising aircraft safety, applications should be made at a height of 10 feet or less above the crop canopy or tallest plants. Applicators must follow the most restrictive use cautions to avoid drift hazards, including those found in this labeling as well as applicable state and local regulations and ordinances.

**Ground Application (Broadcast):** Use 5 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

## MIXING INSTRUCTIONS

Fill the spray tank one-half to three-quarters full with clean water. Use a calibrated measuring device to measure the required amount of **Plateau® herbicide**. Add **Plateau** to the spray tank while agitating. Fill the remainder of the tank with water.

For postemergence applications, add a surfactant to the spray tank (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section of this label for specific recommendations). Maintain agitation while spraying to ensure a uniform spray mixture. An antifoaming agent may be added to the tank if needed.

When tank-mixing **Plateau** with recommended herbicides, add wettable powders, dispersible granules or other dry formulations first, then EC's, then **Plateau**, and then an adjuvant.

## SPRAYING INSTRUCTIONS

**DO NOT** apply during windy or gusty conditions unless applications are being made with a drift control agent and/or an enclosed or shielded spray system. **DO NOT** apply if rainfall is threatening. Rainfall within 1 hour after **Plateau** application may reduce weed control.

### GROUND APPLICATIONS:

Uniformly apply with properly calibrated ground equipment in 2 or more gallons of water per acre. Application equipment, specially designed to make low volume application should be used when making applications using less than 10 gallons of water per acre. A spray pressure of 20 to 40 psi is recommended.

To achieve acceptable control of the target vegetation, good spray coverage of the weed foliage (postemergence) or soil surface (preemergence) is required. To achieve good spray coverage the sprayer must be calibrated to deliver the recommended spray volume and pressure and adjust the spray boom height to ensure proper coverage of weed foliage or soil surface (according to the manufacturer's recommendation). Avoid overlaps when spraying.

### SPOT TREATMENTS:

To prepare the spray solution, thoroughly mix in water 0.25 to 1.5% (0.3 to 1.9 oz/gallon water) **Plateau** plus an adjuvant (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section). A methylated seed oil at 1% v/v is the recommended spray adjuvant except when treating seedling prairiegrasses and wildflowers. When making spot applications, spray coverage should be sufficient to moisten the leaves of the target vegetation, but not to the point of run-off. See section on desired species and **DO NOT** exceed the recommended **Plateau** rate per acre. Also see "WEEDS CONTROLLED" and "SPECIAL WEED CONTROL" sections for specific rate and/or tank-mix recommendations.

## AERIAL APPLICATION:

All precautions should be taken to minimize or eliminate spray drift. Fixed wing aircraft and helicopters can be used to apply **Plateau**<sup>®</sup> herbicide; however, when making applications by fixed wing aircraft maintain appropriate buffer zones to prevent spray drift out of the target area. Aerial equipment designed to minimize spray drift such as a helicopter equipped with a MICROFOIL<sup>™</sup> boom, or THRU-VALVE<sup>™</sup> boom or raindrop nozzles, must be used and calibrated. Except when applying with a MICROFOIL boom, a drift control agent may be added at the recommended label rate. To avoid drift, applications should not be made during inversion conditions, when winds are gusty, or under any other conditions that promote spray drift.

Uniformly apply recommended amount of **Plateau**, using enough water volume to provide adequate coverage of target area or foliage. Include an adjuvant in the spray solution (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section). A foam reducing agent may be added at the recommended rate, if needed. Aerial application to target species growing under the canopy of trees and brush may not receive sufficient spray coverage for effective control. For weed species with a recommended fall application timing (see "SPECIAL WEED CONTROL" section), delaying the aerial application until trees and brush have dropped their leaves can improve weed control and reduce the potential for tree and brush injury (see "TOLERANCE OF TREES AND BRUSH TO PLATEAU HERBICIDE" section).

**IMPORTANT:** Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

Avoid overlaps when spraying.

## SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS

Postemergence applications of **Plateau** require a spray adjuvant. See "SPECIAL WEED CONTROL" section. Due to variations in surfactant contents, certain surfactants containing high amounts of alcohols, paraffin based petroleum oils, and other compounds which can increase phytotoxicity to desirable vegetation, it is recommended to choose a low phytotoxic surfactant.

**Methylated Seed Oils or Vegetable Oil Concentrates:** Instead of a surfactant, a methylated vegetable-based seed oil concentrate containing 5 to 20% surfactant and the remainder methylated vegetable oil is the preferred adjuvant for use with **Plateau** and may be used at the rate of 1.5 to 2 pints per acre. Methylated seed oils provide their greatest effects at 30 GPA or less. At spray volumes above 50 GPA, their advantage appears negated. When using spray volumes greater than 30 gallons per acre methylated seed oil or vegetable based seed oil concentrates should be mixed at a rate of 1% of the total spray volume or alternatively use a nonionic surfactant as described below. Research indicates these oils may aid in deposition and uptake of **Plateau** for hard-to-control perennials, waxy leaf species or when plants are under moisture or temperature stress. **DO NOT** use a methylated seed oil or vegetable oil concentrate when making applications to newly emerged seedling prairiegrasses or wildflowers as injury may occur.

**Nonionic Surfactants:** Use a nonionic surfactant at the rate of 0.25% v/v or higher (see manufacturer's label) of the spray solution (0.25% v/v is equivalent to 1 quart in 100 gallons). For best results, select a nonionic surfactant with a HLB (hydrophilic to lipophilic balance) ratio between 12 and 17 and having at least 60% surfactant in the formulated product (alcohols, fatty acids, oils, ethylene glycol or diethylene glycol should not be considered as surfactants to meet the above requirements).

**Silicone-Based Surfactants:** See manufacturer's label for specific rate recommendations. Silicone-based surfactants may reduce the surface tension of the spray droplet allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants. However, some silicone-based surfactants may dry too quickly, limiting herbicide uptake and higher spray volumes may exhibit "run-off".

**Fertilizer/Surfactant Blends:** Nitrogen-based liquid fertilizers such as 28%N, 32%N, 10-34-0, or ammonium sulfate, may be added at the rate of 2 to 3 pints per acre in combination with the

recommended rate of nonionic surfactant or methylated seed oil. Research indicates that nitrogen based fertilizers aid in the burndown of annual weeds and increase **Plateau** uptake through waxy leaf species. However, fertilizers may increase phytotoxicity to desired species and newly emerged seedling prairiegrasses and wildflowers. The use of liquid fertilizers at a rate of 2 to 3 pints per acre in a tank-mix without a nonionic surfactant or a methylated seed oil is not recommended and may result in herbicide failure. Only when liquid fertilizer is used as the spray carrier is no additional spray adjuvant required.

## TANK MIXES

For use in noncrop areas, **Plateau** may be tank-mixed with PENDULUM<sup>®</sup> herbicide for additional control of late season annual grasses and certain broadleaves. For additional weed control in noncrop areas, **Plateau** may be tank-mixed with ACCORD<sup>®</sup>, ROUNDUP<sup>®</sup> PRO, glyphosate, ARSENAL<sup>®</sup> herbicide, SAHARA<sup>®</sup> DG herbicide, diuron, CAMPAIGN<sup>®</sup>, FINALE<sup>®</sup>, GARLON<sup>™</sup> 3A, MSMA, VANQUISH<sup>®</sup>, OUST<sup>®</sup>, ESCORT<sup>®</sup>, TORDON<sup>®</sup>, or other labeled products. A compatibility test is advised for products not listed. 2,4-D and other phenoxy type herbicides have resulted in reduced control of perennial grass weeds.

**DO NOT** tank mix with organophosphate insecticides or use the same year as **Plateau** when making applications to newly planted areas.

Consult manufacturer's labels for specific rates and weeds controlled. Always follow the more restrictive label when making an application involving tank-mixes.

## FOR WEED CONTROL IN PASTURE AND RANGELAND

For the control of undesirable weeds in pasture and rangeland (see "GUIDELINES FOR RANGELAND USE" section), apply **Plateau** at 2 to 12 oz. per acre as a broadcast treatment or as a 0.25% to 1% solution with 1.0% MSO for spot treatments. See appropriate sections of this label for specific use directions.

## GUIDELINES FOR RANGELAND USE

**Plateau** may be applied to rangeland for the control of undesirable vegetation in order to achieve one or more of the following vegetation management objectives:

1. The control of undesirable (non-native, invasive and noxious) plant species.
2. The control of undesirable vegetation in order to aid in the establishment of desirable rangeland plant species.
3. The control of undesirable vegetation in order to aid in the establishment of desirable rangeland vegetation following a fire.
4. The control of undesirable vegetation for purposes of wildfire fuel reduction.
5. The release of existing desirable rangeland plant communities from the competitive pressure of undesirable plant species.
6. The control of undesirable vegetation for purposes of wildlife habitat improvement.

To ensure the protection of threatened and endangered plants when applying **Plateau** to rangeland:

1. Federal agencies must follow NEPA regulations to ensure protection of threatened and endangered plants.
2. State agencies must work with the Fish and Wildlife Service or the Service's designated state conservation agency to ensure protection of threatened and endangered plants.
3. Other organizations or individuals must operate under a Habitat Conservation Plan if threatened or endangered plants are known to be present on the land to be treated.

Please see the appropriate section(s) of this label for specific use directions for the desired rangeland vegetation management objective.

**Plateau** should only be applied to a given rangeland acre as specific weed problems arise. For the control of annual weed species such as cheatgrass, downy brome and medusahead rye, a single application of **Plateau** that coincides with the successful establishment and/or release of desirable rangeland vegetation and the use of available IPM can provide effective, sustainable control of the annual weed problem. For difficult to control perennial weed

species such as leafy spurge, dalmatian toadflax and Russian knapweed, a single broadcast application of **Plateau® herbicide** should be effective in most cases. If needed, spot treatments with **Plateau** can be used to control any remnant plants or new seedlings that may emerge. Long term control of undesirable weed species ultimately depends on the successful use of land management practices that promote the growth and sustainability of desirable rangeland plant species.

## USE OF PLATEAU HERBICIDE ON FEDERAL CONSERVATION RESERVE PROGRAM (CRP) LAND

**Plateau** may be used on Federal Conservation Reserve Program (CRP) land at rates up to 12 oz. per acre per year (see minimum plant-back intervals below). See appropriate section of this label for specific instructions for the intended use.

## ROTATIONAL CROP RESTRICTIONS

The following rotational crops may be planted after applying **Plateau**. Planting rotational crops earlier than the recommended interval may result in crop injury.

Plateau Use Rate (oz/A)	Minimum Plant Back Interval (Months After Plateau Herbicide Application)					
	≤4	12	12	18	26	40
5-8	12	12	22	30	44	
9-12	12	18	24	36	48	
<b>Rotational Crops</b>	Bahiagrass CLEARFIELD® corn hybrids Peanuts Rye Wheat	Snapbeans Southern peas Soybeans Tobacco	Barley Colton <sup>1</sup> Grain sorghum Oats	Field corn <sup>2</sup> All crops not otherwise list- ed or included for use on this label <sup>2</sup>	Canola <sup>2</sup> Potatoes <sup>2</sup> Red label <sup>2</sup> beets <sup>2</sup>	

### 1 For Arizona, New Mexico, Oklahoma, and Texas only:

Depending on the **Plateau** use rate, cotton may be planted 18 to 24 months after **Plateau** application in the states of Arizona, New Mexico, Oklahoma, and Texas unless drought conditions develop the year of **Plateau** application. **DO NOT** rotate to cotton at 18 to 24 months after **Plateau** application if less than 15 inches of rainfall or irrigation is received from the time of **Plateau** application through November 1 of the same year. If drought conditions develop the year of **Plateau** application, cotton may be planted 26, 30 and 40 months after **Plateau** application.

<sup>2</sup> After the recommended rotational interval listed for these selected crops and for all crops not otherwise listed or included for use on this label, a successful field bioassay must be completed. The field bioassay consists of a test strip of the intended rotational crop planted across the previously treated field and grown to maturity. The test strip should include low areas and knolls, and include variations in soil such as type and pH. If no crop injury is evident in the test strip, then the intended rotational crop may be planted the following year.

**Use of Plateau** in accordance with label directions is expected to result in normal growth of plant-back crops in most situations; however, various environmental and agronomic factors make it impossible to eliminate all risks associated with the use of this product and, therefore, plant-back crop injury is always possible. If crop injury is a concern then a bioassay with the desired crop is recommended prior to planting.

## FOR FOLIAR AND SEEDHEAD SUPPRESSION OF BAHIAGRASS, COOL SEASON GRASSES AND SUPPRESSION OF SOME ANNUAL WEEDS

**Bahiagrass:** **Plateau** may be used at the rate of 2 to 6 oz per acre to suppress growth and seedhead development of bahiagrass in unimproved areas. In North and South Carolina it is recommended to use **Plateau** at the rate of 2 oz or 3 oz per acre respectively, as higher rates may cause turf thinning. Depending on rate of **Plateau** used, surfactant and environmental conditions, temporary turf discoloration may occur. For optimum performance, application should be made after green-up. Applications may be made before or after mowing. If applied prior to mowing, raise mowing height to leave adequate existing foliage as new growth will be suppressed. If applied after mowing, allow adequate foliage to remain by increasing mower height or allowing time for foliar regrowth prior to

application. **DO NOT** apply to turf under stress (drought, cold, insect, disease, etc.) or severe injury may occur. **DO NOT** use a methylated seed oil adjuvant.

PLATEAU	PHYTOTOXICITY	LENGTH OF SUPPRESSION
2 oz	none to low	partial to season long
3 to 6 oz	low to moderate	season long

For winter annual weed control, apply 8 oz of **Plateau** when bahiagrass is dormant, but when weeds are actively growing. This can be followed by 3 to 4 oz of **Plateau** in the spring after bahiagrass green-up for the suppression of seedheads and foliage.

### Cool Season Grasses:

#### KY31 Tall Fescue and "Wildtype Common" Kentucky Bluegrass:

Apply **Plateau** at 2 to 4 oz per acre for foliar and seedhead suppression of certain cool season grasses such as "KY31" tall fescue and "wildtype common" Kentucky bluegrass. **DO NOT** use a methylated seed oil adjuvant. Add a surfactant to the 2 oz rate of **Plateau** for optimum performance. The addition of a surfactant to 4 oz of **Plateau** may cause excessive turf injury or mortality of tall fescue. Application to turf type tall fescue or Kentucky bluegrass may result in severe injury or loss of stand.

**Wheatgrass:** Apply **Plateau** at 6 to 10 oz. per acre for foliar and seedhead suppression of crested wheatgrass, and 6 to 12 oz. per acre for foliar and seedhead suppression of intermediate wheatgrass. Other wheatgrass species may also be suppressed, however, apply **Plateau** to a limited area to determine effectiveness. Tank-mixes with 2,4-D or products containing 2,4-D may decrease the effectiveness of **Plateau**. Tank-mixes with GARLON®, TORDON®, TRANSLINE™ and VANQUISH® may decrease the potential of turf injury. **DO NOT** apply to turf under stress or severe injury may occur.

## FOR THE CONTROL OF UNDESIRABLE WEEDS IN BERMUDAGRASS NOT BEING GROWN FOR FORAGE OR HAY

**Plateau** may be used on bermudagrass turf such as roadsides, utility rights-of-way, railroad crossings, airports, non-irrigation drainage ditches and other noncropland sites. There is a differential tolerance between bermudagrass types (see below paragraphs). Depending on bermudagrass type, timing of application, and **Plateau** rate, some foliar, stolon, and seedhead suppression may occur. **IMPORTANT:** Apply **Plateau** after bermudagrass has reached full green-up. Spring applications made prior to full green-up may delay green-up. Always add a surfactant when applying **Plateau**. **DO NOT** apply to grass under stress from drought, disease, insects or other causes. Simultaneous mow/spray operations may suppress internode development. After mowing, allow adequate foliage regrowth prior to **Plateau** application as some internode suppression may prevent bermudagrass from quickly recovering from mowing.

**Common Bermudagrass:** Common bermudagrass is the most tolerant bermudagrass to **Plateau**. Tank-mixes with ROUNDUP PRO, ACCORD or glyphosate will improve the weed control spectrum, but may increase turf phytotoxicity. Some stolon internode shortening and seedhead suppression may occur for the first 8 weeks.

**Established Coastal Bermudagrass:** **Plateau** at 2 to 12 oz per acre will provide control of labeled weeds as well as foliar and seed head suppression of established coastal bermudagrass. **DO NOT** use on World Feeder varieties of bermudagrass. Depending on environmental conditions and weed pressure, the longevity of suppression and weed control increases as the **Plateau** rate increases. Tank-mixes with ROUNDUP PRO, ACCORD, or glyphosate may result in death or excessive injury of coastal bermudagrass.

**Turf Type Bermudagrass:** Turf type bermudagrass varieties show a high degree of variation in tolerance to **Plateau**. **Plateau** at rates of 2 to 6 oz per acre will provide some annual weed control and foliar & seedhead suppression. Rates above 6 oz per acre may result in excessive injury or death of turf type bermudagrass.

**SEE ABOVE SECTIONS FOR PLATEAU® HERBICIDE RATES AND TIMINGS FOR SPECIFIC BERMUDAGRASS TYPES WITH REGARD TO WEED CONTROL AND TURF TOLERANCE.**

**Winter Annual Weed Control:** Apply Plateau at the rate of 4 to 12 oz. per acre prior to winter weed germination or while winter weeds are actively growing. Early spring applications may delay green-up of bermudagrass turf.

**Summer Annual Weeds:** For best results, apply Plateau at the rate of 4 to 12 oz per acre preemergence or early postemergence before weeds have reached 6 inches in height. Larger weeds may be controlled depending on susceptibility, growing conditions, tank-mix partner and adjuvant selection.

**Perennial Weeds:** Apply Plateau at the rate of 8 to 12 oz per acre postemergence after weeds have produced adequate foliage for herbicide uptake. For a particular weed see "SPECIAL WEED CONTROL" section below. The addition of ACCORD or ROUNDUP PRO herbicide may increase control.

**Bahiagrass Control:** Apply Plateau at the rate of 8 to 12 oz per acre postemergence. See "SPECIAL WEED CONTROL" section below for recommendations. The addition of ROUNDUP PRO or ACCORD herbicide at 12 to 16 oz per acre may increase control.

### FOR THE CONTROL OF UNDESIRABLE WEEDS IN UNIMPROVED CENTIPEDE GRASS

Plateau may be applied at a rate of 4 to 8 oz per acre to established centipede grass for the control of annual broadleaf and grass weeds. Apply Plateau after centipede grass has reached full green-up. Spring applications made prior to full green-up may delay green-up. Always add a surfactant when applying Plateau. **DO NOT** apply to grass under stress from drought, disease, insects or other causes. Simultaneous mow/spray operations may suppress internode development. After mowing, allow adequate foliage regrowth prior to Plateau application as some internode suppression may prevent centipede grass from quickly recovering from mowing.

### FOR CONTROL OF UNDESIRABLE WEEDS IN SMOOTH BROMEGRASS, WILDTYPE COMMON KENTUCKY BLUEGRASS AND WHEATGRASSES

Plateau may be used on smooth bromegrass, "wildtype" common Kentucky bluegrass and wheatgrass. Plateau provides control of labeled grass and broadleaf weeds (see "WEEDS CONTROLLED" and "SPECIAL WEED CONTROL" sections). Treatment of smooth bromegrass and wheatgrass with Plateau may result in foliar height and seedhead suppression.

**Smooth Bromegrass and "Wildtype" Common Kentucky Bluegrass:** Use Plateau at 4 to 8 oz per acre in the spring for weed control and growth suppression after smooth bromegrass and "wildtype" common Kentucky bluegrass have reached 100% green-up. Applications prior to 100% green-up may delay green-up. Rates from 8 to 12 oz per acre may be applied in the spring but may result in excessive growth suppression. For fall applications (see "SPECIAL WEED CONTROL" section), Plateau may be used at 8 to 12 oz per acre for control of perennial weeds.

**Wheatgrass:** To control undesirable weeds in wheatgrasses apply Plateau at 4 to 12 oz. per acre.

### FOR CONTROL OF UNDESIRABLE WEEDS IN CROWN VETCH

Plateau may be applied at the rate of 4 oz per acre to newly seeded crown vetch beds to aid in the establishment of vetch and reduce weed competition.

Plateau at 8 to 12 oz per acre may be used on unimproved established crown vetch in noncropland areas. Plateau provides control of labeled grass and broadleaf weeds (refer to the "WEEDS CONTROLLED" and "SPECIAL WEED CONTROL" sections for specific rates). Treatment of crown vetch beds with Plateau may cause internode shortening and some minor tip chlorosis depending on timing of application.

Plateau should be applied during winter dormancy or early spring to reduce potential injury. Applications made after May, may result in increased injury or defoliation. Addition of surfactants such as dilimene based or crop oil concentrates will increase injury. Fall applications during the period of active crown vetch growth may result in severe injury or loss of stand.

### REVEGETATION WITH PRAIRIEGRASSES AND OTHER FORAGE GRASSES

Plateau may be applied at the rate of 2 to 12 oz per acre to newly established or existing stands of labeled species (see below for details) in such areas as pasture, rangeland (see "GUIDELINES FOR RANGELAND USE" section), Conservation Reserve Program (CRP) land and noncropland sites such as roadsides, industrial sites, prairie restoration sites, drainage ditch banks, and other similar areas. Certain local ecotypes or varieties may be suppressed by Plateau. Many factors such as poor seedling vigor, cool temperatures, poor soil, planting depth, excessive moisture, disease, insects and dry weather after emergence can all result in poor stands. Additional stress of herbicide residue, poor soils and other factors contributing to poor seedling vigor can also increase injury and could result in mortality. BASF can not be held responsible for such unforeseen factors. It is suggested to try Plateau on a small area if tolerance is not known. Plateau controls many annual and perennial grass and broadleaf weeds. Weed competition is reduced allowing grass seedlings to establish. Plateau is also effective for control of noxious weeds in established grass stands and must be applied postemergence as a foliar treatment to perennial weeds. **IMPORTANT: ALWAYS ADD AN ADJUVANT** when applying Plateau. To maximize weed control always use a methylated seed oil when treating established grass stands. Use a nonionic surfactant when treating newly emerged seedling grasses. The addition of liquid fertilizer will decrease grass tolerance and should not be used when treating newly emerged seedling grasses.

Plateau may be applied at a rate of up to 12 oz per acre to Federal Conservation Reserve Program (CRP) land for the establishment or release of certain grass species (see "TOLERANT GRASS SPECIES" table).

**Establishment:** For optimum results in establishing mixed grass stands with Plateau, make application at planting before grass seedlings emerge. Newly emerged grasses can be sensitive to Plateau and/or the adjuvant used. If grasses have begun to emerge, it is best to wait until they have reached the five leaf stage to make a Plateau application and use a nonionic or silicone surfactant. **DO NOT** use a methylated seed oil at this time as some grass species tolerance will be lost. Plateau will control annual weeds preemergence or early postemergence. See "WEEDS CONTROLLED" section for maximum height of weeds and see below for more details on best rate and timing for grass and wildflower species. Postemergence applications may result in stand thinning due to variability in seedling grass tolerance to the use of spray adjuvants. Seedling grasses are generally more tolerant to the use of spray adjuvants after they have reached the five leaf stage. When planting into a field which was row cropped the previous year, compounded injury may occur from herbicide carry-over (see "DIRECTIONS FOR USE" section).

**Rates and Control:** Apply Plateau at 2 to 6 oz per acre to fields cropped the previous year, when annual weeds are the target and/or if grass/forb mixtures are used. Plateau at 2 to 6 oz per acre will provide control and/or suppression of many annual grass and broadleaf weeds. Use lower rates when in the northern most U.S., dry climates or for late season plantings into clean seedbeds.

Plateau rates as low as 2 oz. per acre may be used on soils with a pH > 7, a low CEC and a coarse texture containing a minimum of clay and organic matter. Use higher rates in heavy weed pressure, heavy residue, high organic matter, high rainfall and long growing season (southern portions of Illinois, Indiana, Missouri and Ohio, etc.). Apply Plateau at 8 to 12 oz per acre for giant ragweed or for perennial weed control/suppression. Plateau rates of 8 to 12 oz per acre may result in stunting or stand thinning. The duration and intensity of suppression are directly related to weed pressure, chemical residue, soil type and environmental conditions. See below for details for particular grass tolerances and timings.

**Established Stands:** For optimum results, apply Plateau as an early postemergence application to annual grasses and broadleaf weeds. For perennial weed control, see "SPECIAL WEED CONTROL" section. The use of high rates may result in foliar and/or seed head height suppression of established grass stands. This effect is more likely to occur under conditions of light soils, low weed pressure, low rainfall, and short growing seasons. Use the lower rates for light weed infestations or when applying to grass stands containing desirable wildflowers and legumes (see "WILDFLOWER ESTABLISHMENT AND MAINTENANCE" section for rate tolerance). Use higher rates to broaden and lengthen weed control spectrum.

**Big Bluestem, Little Bluestem and Indiangrass: Plateau® herbicide** may be applied at the rate of 2 to 12 oz per acre at planting, or any time thereafter, including after seedling grasses have emerged or to perennial stands (dormant or actively growing). See "WEEDS CONTROLLED" section for desired rate. Use the lower rates in Wisconsin, Michigan, Minnesota, South Dakota, North Dakota, Kansas, Oklahoma, Texas and Nebraska and higher rates as rainfall and/or growing season increases.

**Switchgrass (*Panicum virgatum*):** Plateau is not recommended for the establishment of pure switchgrass stands as severe injury or death may result. Plateau may be applied at a rate of 2 to 4 oz per acre if switchgrass is planted in mixed stands with tolerant species, but only if some stand thinning or loss of stand can be tolerated. Mature switchgrass planting can be reclaimed from certain perennial weeds such as tall fescue, leafy spurge, johnsongrass, etc., with Plateau at rates of 10 to 12 oz per acre. However, severe stunting and injury is imminent. **DO NOT** apply Plateau to switchgrass if such severe injury can not be tolerated.

**Sideoats and Blue Grama:** Apply Plateau to monoculture stands of sideoats and blue grama only if some stand thinning or loss of stand can be tolerated. Plateau may be applied at the rate of 2 to 4 oz/A plus an adjuvant to aid in the establishment of sideoats and blue grama after new seedlings have emerged and reached the five (5) leaf stage. When using Plateau at 4 oz per acre it is not recommended to use in combination with a methylated seed oil adjuvant as stand thinning may occur. The lower rates may provide adequate weed suppression in early summer plantings in the states of Wisconsin, Michigan, Minnesota, South Dakota, North Dakota, Kansas, Oklahoma, Texas and Nebraska and other states where growing degree days are short. Sideoats and blue grama have shown tolerance to Plateau at 2 to 4 oz/A, applied preemergence at planting, however, some stand thinning may occur. For weed control in established stands use 4 to 10 oz/A of Plateau. Up to 12 oz/A of Plateau may be applied, but may result in foliar and/or seedhead suppression, or in the injury of sideoats and blue grama, depending on surfactant choice, soil type, variety, weed pressure and environmental conditions.

**Buffalograss:** Apply Plateau at the rate of 2 to 4 oz/A for control or suppression of labeled weeds and to aid in the establishment of newly sprigged buffalograss. Apply Plateau immediately after planting prior to spring growth or seed germination. New growth and small seedlings can be severely injured or killed. If applying after emergence it is best to wait until buffalograss has at least five true leaves and use a nonionic or silicone surfactant. **DO NOT** use a methylated seed oil. For established stands, Plateau may be applied at the rate of 2 to 8 oz/A for weed control. Higher rates may cause some turf discoloration and stunting. Plateau may be applied to dormant buffalograss to control winter annual weeds. Turf type buffalograss may express different tolerance level to Plateau than wild type buffalograss. Some turf types can tolerate low rates of Plateau at seeding. Consult seed dealer for details.

**Eastern Gamagrass:** Plateau should only be used for the establishment or maintenance of eastern gamagrass if some stand thinning or loss can be tolerated. Apply Plateau at 2 to 6 oz per acre at planting prior to gamagrass emergence. Stand thinning and stunting is imminent. Adverse conditions, poor soils, or added stress to the gamagrass could result in stand mortality. Postemergence application to seedlings will cause mortality. On established eastern gamagrass, apply Plateau at 2 to 8 oz per acre prior to gamagrass breaking dormancy. Some stunting will occur and increases as the Plateau rate increases. Applications made during or after green-up may result in foliar and seedhead suppression and possible mortality of weak plants.

**Tall Fescue Control:** (Not for use in California unless directed otherwise in supplemental labeling.) Tall fescue can be controlled by using Plateau at the rate of 12 oz per acre plus methylated seed oil at 2 pints per acre in established stands of or to prepare a seed bed for big bluestem, little bluestem, and indiangrass. The addition of nitrogen fertilizer (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section) to the above mix will aid in control. Tall fescue must be actively growing for optimum control. If tall fescue has reached the boot stage or has reached summer dormancy, control may be poor. For improved control of tall fescue, Plateau may be tank mixed with ACCORD®, ROUNDUP® PRO, or glyphosate. Fall applications of Plateau at 8 to 12 oz/A plus 24 to 64 oz/A ACCORD® or ROUNDUP® PRO will result in best control of existing tall fescue and new germinating seedlings. With spring applications of Plateau at 6 to 12 oz/A, plus a ACCORD® or ROUNDUP® PRO at 32 to 64 oz/A, use higher rates for older, mature fescue stands and lower Plateau rates when planting forbs. When using 8 oz/A of Plateau in the fall with a glyphosate product, it is recommended to apply 4 oz/A Plateau in

the spring at planting for annual weed and seedling fescue control. Burning the fescue stand, where permitted, the following spring, just prior to green-up, will aid in control and provide a better seedbed for planting. Mowing the fescue several times the summer before fall application will weaken the fescue root system, making it more susceptible to herbicides. Always allow for at least 10 inches of regrowth, following the last mowing before spraying, as both Plateau and glyphosate products need foliage present for herbicide uptake and satisfactory control.

#### TOLERANT GRASS SPECIES<sup>1</sup>

Common Name	Genus Species	Plateau Rate (oz/A) <sup>2</sup>	
		New Seeding	Established
Big Bluestem	<i>Andropogon gerardii</i>	2-12	2-12
Little Bluestem	<i>Schizachyrium scoparium</i>	2-12	2-12
Indiangrass	<i>Sorghastrum nutans</i>	2-12	2-12
Bushy Bluestem	<i>Andropogon glomeratus</i>	—*	2-12
King Ranch Bluestem	<i>Bothriochloa ischaemum</i>	—	2-12
Silver Beard Bluestem	<i>Bothriochloa saccharoides</i>	—	2-12
Broomsedge	<i>Andropogon virginicus</i>	—	2-12
Fingergrass, Rhodes grass	<i>Choris</i> spp.	—	2-12
Needlegrass	<i>Stipa</i> spp.	—	2-12
Needleandthread	<i>Stipa comata</i>	—	2-12
Kearny (Plains) Threeawn	<i>Aristida longespica</i>	—	2-12
Prairie Threeawn	<i>Aristida oligantha</i>	—	2-12
Prairie Sandreed	<i>Calamovilla longifolia</i>	—	2-12
Smooth Bromegrass	<i>Bromus inermis</i>	—	2-12
Kentucky Bluegrass	<i>Poa pratensis</i>	—	2-12 <sup>4</sup>
Sandberg's Bluegrass	<i>Poa sandbergii</i>	—	2-12
Wheatgrasses	<i>Agropyron</i> spp.	—	2-12
Bottlebrush Squirretail	<i>Sitanian hystrix</i>	—	2-12
Russian Wild Ryegrass	<i>Elymus junceus</i>	2-6 <sup>2</sup>	2-12
Sideoats Grama	<i>Bouteloua curtipendula</i>	2-8 <sup>3</sup>	2-8
Blue Grama	<i>Bouteloua gracilis</i>	2-8 <sup>3</sup>	2-8
Buffalograss	<i>Buchloe dactyloides</i>	2-4	2-8
Eastern Gamagrass	<i>Tripsacum dactyloides</i>	2-6 <sup>3</sup>	2-8

<sup>1</sup>See individual grass sections for application timing.

<sup>2</sup>High rates may result in stunting and growth suppression.

<sup>3</sup>Plateau preemergence applications to newly seeded sideoats, blue grama and Eastern gamagrass may result in thinning or loss of stand.

<sup>4</sup>Some bluegrass varieties are sensitive to Plateau. Drought can delay recovery and may result in overgrazing of treated area.

\*Tolerance unknown

**TOLERANCE OF ESTABLISHED GRASSES TO  
8 TO 12 OZ/A OF PLATEAU® HERBICIDE  
APPLIED IN THE FALL**

Grass Species <sup>1</sup>	Tolerant	Not Suppressed <sup>2</sup>	Tolerant	Unknown
Bermudagrass	X			
Bluegrass, Kentucky		X		
Bluegrass, Sandberg's	X			
Bluestem, big	X			
Bluestem, bushy	X			
Bluestem, King Ranch	X			
Bluestem, little	X			
Bluestem, silver beard	X			
Bromegrass, meadow		X	X	
Bromegrass, smooth	X			
Broomsedge	X			
Buffalograss	X	X		
Cheatgrass			X	
Creeping foxtail, Garrison			X	
Downey brome			X	
Fescue, Idaho	X			
Fescue, tall			X	
Gamagrass, eastern	X			
Grama, blue	X	X		
Grama, sideoats	X	X		
Indiangrass	X			
Medusahead			X	
Needleandthread	X			
Needlegrass, green	X			
Orchardgrass		X		
Prairie cordgrass	X			
Prairie dropseed			X	
Praire sandreed	X			
Praire threawn	X			
Quackgrass		X		
Redtop		X	X	
Reed canarygrass	X	X		
Rhodes grass/Fingergrass	X			
Ryegrass, annual or Italian		X		
Ryegrass, perennial	X	X		
Squirretail, bottlebrush	X			
Switchgrass		X	X	
Timothy			X	
Wheatgrass, bluebunch	X	X		
Wheatgrass, crested	X	X		
Wheatgrass, intermediate	X	X		
Wheatgrass, pubescent	X	X		
Wheatgrass, siberian	X			
Wheatgrass, slender	X	X		
Wheatgrass, stream-bank	X	X		
Wheatgrass, western	X	X		
Wild ryegrass, Basin	X			
Wild ryegrass, Canada		X		
Wild ryegrass, Russian	X			
Wild ryegrass, Virginia		X		

<sup>1</sup> Species with an X in more than one column means tolerance will vary depending on variety, use rate and environmental conditions.

<sup>2</sup> Suppression may be expressed as reduction in number of seedheads, seedhead height suppression or foliage height reduction; however, full recovery of the grass can be expected.

**WILDFLOWER ESTABLISHMENT  
AND MAINTENANCE**

Due to high degree of variation in genotypes, ecotypes and varieties of wildflowers, tolerances to **Plateau** can vary dramatically and may be reduced under certain soil types and environmental conditions. Apply **Plateau** only if some stand thinning or loss can be tolerated. Preemergence applications of low use rates (2 oz/A)

to tolerant species, result in the least amount of injury, but may not eliminate it. Postemergence applications of **Plateau** can result in injury or death of some genotypes, and should be used only as a rescue treatment when weed competition threatens the stand. Use of certain spray adjuvants can also increase wildflower injury and loss of stand. Although most legumes listed in the tolerance table are tolerant to 4 oz/A of **Plateau** preemergence, some stand thinning may occur. Legumes are more tolerant to post applications, but chlorosis or stunting is possible. Recommendations listed in the tables below are designed for mixed grass/wildflower stands. Less than satisfactory results may occur from applications to monoculture stands. It is recommended to try on a small scale to determine degree of satisfaction on monoculture stands.

**For prairiegrass/wildflower mixtures:** Where some wildflower injury (phytotoxicity, height suppression) can be tolerated, apply **Plateau** at the rate to achieve desired weed control, but not to exceed tolerance rate listed in the table below. Wildflower injury can be reduced or eliminated with preemergence applications. To minimize injury, apply **Plateau** at 2 to 4 oz per acre at planting to tolerant species listed below. Use the 2 oz per acre rate under cool dry conditions and in low rainfall areas. If postemergence application is made to established prairiegrass/wildflower mixtures, use the lowest rate of **Plateau** necessary to achieve desired weed control (see "WEEDS CONTROLLED" section). Postemergence application can result in stand thinning or death due to vast variation in seed sources, varieties and genotypes. It is recommended that a small area be tested prior to full application for tolerance of desired species. The rates listed below are for those species in which acceptable tolerance has been confirmed on the varieties/genotypes being treated.

Application of **Plateau** in conjunction with an organophosphate insecticide may cause an increase in wildflower injury.

**Seedling Wildflower and Legume Tolerance to  
**Plateau** (4 oz/A)<sup>1</sup> in Mixed Grass/Forb Stands.**

Common Name	Genus Species	PRE	POST
Alfalfa	<i>Medicago sativa</i>	No	Yes
Aster, New England	<i>Aster novae angiae</i>	No	Yes
Aster, Prairie	<i>Aster tanacetifolius</i>	No	Yes
Baby Blue Eyes	<i>Nemophila menziesii</i>	No	Yes
Beggar ticks	<i>Bidens frondosa</i>	No	Yes
Bird's Eyes	<i>Gilia tricolor</i>	No	Yes
Bishop's Flower	<i>Anuni majus</i>	No	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	Yes	Yes
Blanketflower	<i>Gaillardia aristata</i>	No	Yes
Bundleflower, Illinois	<i>Desmanthus illinoensis</i>	Yes	Yes
Catchfly	<i>Silene armeria</i>	No	Yes
Chicory	<i>Cichorium intybus</i>	Yes	Yes
Clover, Crimson	<i>Trifolium incarnatum</i>	Yes	Yes
Clover, White	<i>Trifolium repens</i>	No	Yes
Coneflower, Purple	<i>Echinacea purpurea</i>	Yes	Yes
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	Yes	Yes
Coreopsis, Dwarf Red Plains	<i>Coreopsis tinctoria</i> var. Gay Feather	Yes	Yes
Coreopsis, Lance Leaved	<i>Coreopsis lanceolata</i>	Yes	Yes
Coreopsis, Plains	<i>Coreopsis tinctoria</i>	Yes	Yes
Cornflower	<i>Centaurea cyanus</i>	No	Yes
Cosmos, Garden	<i>Cosmos bipinnatus</i>	Yes	Yes
Cosmos, Yellow	<i>Cosmos sulphureus</i>	Yes	Yes
Daisy, Ox-eye	<i>Chrysanthemum leucanthemum</i>	Yes	Yes
Daisy, Shasta	<i>Chrysanthemum maximum</i>	Yes	Yes
Five Spot	<i>Nemophila maculata</i>	No	Yes
Flax, Blue	<i>Linum perenne</i>	No	Yes
Indian Blanket	<i>Gaillardia pulchella</i>	No	Yes
Indigo, Blue False	<i>Baptisia australis</i>	Yes	No
Johnny Jump-ups	<i>Viola cornuta</i>	Yes	Yes
Lemon Mint	<i>Monarda citriodora</i>	No	Yes

**Seedling Wildflower and Legume Tolerance to Plateau® herbicide (4 oz/A)<sup>1</sup> in Mixed Grass/Forb Stands. (CONT):**

Common Name	Genus Species	PRE	POST
Lespedeza, Bicolor	<i>Lespedeza</i>	Yes	Yes
Lespedeza, Korean	<i>Lespedeza stipulacea</i>	No	Yes
Lespedeza, Sericea	<i>Lespedeza cuneata</i>	No	Yes
Lupine, Perennial	<i>Lupinus perennis</i>	Yes	Yes
Mexican Hat	<i>Ratibida columnifera</i>	Yes	Yes
Partridgepea	<i>Cassia fasciculata</i>	Yes	Yes
Pea, Calico	<i>Pisum viginianum</i>	Yes	Yes
Pea, Flat	<i>Lathyrus sylvestris</i>	Yes	Yes
Pea, Perennial	<i>Lathyrus latifolius</i>	Yes	Yes
Phlox, Drummond	<i>Phlox drummondii</i>	Yes	No
Poppy, California	<i>Eschscholzia californica</i>	Yes	No
Poppy, Corn	<i>Papaver rhoes</i>	Yes	Yes
Poppy, Red Corn	<i>Papaver</i> sp.	Yes	Yes
Prairieclover, Purple	<i>Dalea purpurea</i>	Yes	Yes
Prairieclover, White	<i>Dalea candidum</i>	Yes	Yes
Tick-trefoil, Showy	<i>Desmodium canadense</i>	No	Yes
Trefoil, Birdsfoot	<i>Lotus corniculatus</i>	No	Yes
Vetch, Crown	<i>Coronilla varia</i>	Yes	—
Vetch, Hairy	<i>Vicia villosa</i>	Yes	—
Yarrow, Gold	<i>Achillea filipendulina</i>	No	Yes

<sup>1</sup> For legumes, at least three true leaves should be present before a postemergence application.

**Established Wildflower and Legume Tolerance to Plateau (maximum rate<sup>1</sup>, oz/A) in Mixed Grass/Forb Stands.**

Common Name	Genus Species	PRE	POST <sup>2</sup>
Flax, Blue	<i>Linum perenne</i>	0	6
Indian Blanket	<i>Gaillardia pulchella</i>	0	6
Blanketflower	<i>Gaillardia aristata</i>	0	8
Chickory	<i>Cichorium intybus</i>	4	6
Daisy, Shasta	<i>Chrysanthemum maximum</i>	4	8
Prairieclover, Purple	<i>Dalea purpurea</i>	4	12
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	6	6
Mexican Hat	<i>Ratibida columnifera</i>	6	6
Poorjoe	<i>Diodia teres</i>	8	—
Lupine, Perennial <sup>1</sup>	<i>Lupinus perennis</i>	8	12
Coneflower, Purple	<i>Echinacea purpurea</i>	8	8
Daisy, Ox-eye <sup>3</sup>	<i>Chrysanthemum leucanthemum</i>	8	8
Leadplant	<i>Amorpha canescens</i>	8	8
Lespedeza, Bicolor	<i>Lespedeza</i>	8	8
Milkweed, Common	<i>Asclepias syriaca</i>	8	—
Pea, Prairie Scurf	<i>Psoralea esculenta</i>	8	8
Yarrow, Gold <sup>3</sup>	<i>Achillea filipendulina</i>	8	8
Blackeyed Susan	<i>Rudbeckia hirta</i>	8	10
Johnny Jump-ups	<i>Viola cornuta</i>	8	12
Sweetclover	<i>Melilotus</i> sp.	12	8
Alfalfa	<i>Medicago sativa</i>	12	12
Bundleflower, Illinois	<i>Desmanthus illinoensis</i>	12	12
Lespedeza, Sericea	<i>Lespedeza cuneata</i>	12	12
Partridgepea	<i>Cassia fasciculata</i>	12	12
Sensitive vine	<i>Mimosa strigillosa</i>	12	12
Vetch, Crown	<i>Coronilla varia</i>	12	12
Violet, Wild	<i>Viola</i> spp.	12	12

<sup>1</sup> Height suppression or stand reduction may occur at maximum use rate. For legumes, some yellowing and stunting can occur at higher use rates.

<sup>2</sup> Postemergence application should be made early post on the flowers to reduce injury and increase flower set.

<sup>3</sup> Will not flower.

<sup>4</sup> Most native rangeland lupines are tolerant to Plateau at 12 oz/A postemergence.

**Wildflower Establishment with Plateau 4 oz/A + PENDULUM herbicide 2 lbs a.i./A<sup>1</sup>**

Common Name	Genus Species	PRE <sup>2</sup>	POST <sup>3</sup>
Blackeyed Susan	<i>Rudbeckia hirta</i>	Yes	Yes
Blanketflower	<i>Gaillardia pulchella</i>	No	Yes
Bundleflower, Illinois	<i>Desmanthus illinoensis</i>	>50% thinning	Yes
Clover, Crimson	<i>Trifolium incarnatum</i>	>50% thinning	Yes
Coneflower, Clasping	<i>Dracopis amplexicaulis</i>	Yes	Yes
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	No	OK
Coneflower, Purple	<i>Echinacea purpurea</i>	Yes	Yes
Coreopsis, Dwarf Red Plains	<i>Coreopsis tinctoria</i> var. <i>Gay Feather</i>	OK stunting	OK stunting
Coreopsis, Plains	<i>Coreopsis tinctoria</i>	OK stunting	Yes
Coreopsis, Lance Leaved	<i>Coreopsis lanceolata</i>	25% thinning	Yes
Cornflower	<i>Centaurea cyanus</i>	No	OK 20% thinning
Cosmos, Garden	<i>Cosmos bipinnatus</i>	OK 10% thinning	OK stunting
Cosmos, Yellow	<i>Cosmos sulphureus</i>	Yes	Yes
Daisy, Ox-eye	<i>Chrysanthemum leucanthemum</i>	25% thinning	Yes
Daisy, Shasta	<i>Chrysanthemum maximum</i>	marginal-OK 20% thinning	Yes
Lupine, Perennial	<i>Lupinus perennis</i>	Yes	≤50% thinning
Partridgepea	<i>Cassia fasciculata</i>	25% thinning	Yes
Poppy, California	<i>Eschscholzia californica</i>	Yes	25% injury stunting, thinning
Yarrow, Gold	<i>Achillea filipendulina</i>	OK thinning	OK

<sup>1</sup> 2 lbs a.i./A = 2.4 qts of PENDULUM herbicide 3.3 EC or 3.3 lbs of PENDULUM herbicide WDG

<sup>2</sup> Preemergence at planting

<sup>3</sup> Postemergence to seedlings

Yes = no injury

No = results in no wildflower germination or unacceptable injury to seedling flowers.

OK = can be used if thinning and/or stunting can be tolerated or if establishment is threatened by weed competition.

Due to the diversity of species and varieties that exist in areas where wildflowers are grown, the response to Plateau may vary greatly. Careful testing on desirable species is recommended to determine if area-wide applications can be made. Try on a limited area to verify tolerance in a specific area.

The suitability of Plateau use on wildflower species not listed, should be determined by treating a small number of such wild flowers at an appropriate rate, not to exceed 12 oz per acre per year. Treated wildflowers should be evaluated 1 to 2 months following application for possible injury. THE USER ASSUMES RESPONSIBILITY FOR ANY DAMAGE OR OTHER LIABILITY.

**SPECIAL WEED CONTROL**

(Not for use in California unless directed otherwise in supplemental labeling.)

ALWAYS ADD AN ADJUVANT to Plateau (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section). Research has shown Methylated Seed Oil (MSO) surfactants provide Plateau with superior control of perennial weeds. This effect is not always observed and is most prevalent on waxy leaf species, perennials and weeds under stress conditions. For the weeds listed below, it is recommended to use a MSO for best results. The use of nonionic surfactants or silicone based surfactants may result in less than acceptable control.

**Johnsongrass & Itchgrass:** For best results, apply Plateau at the rate of 8 to 12 oz per acre after johnsongrass or itchgrass has reached 18 to 24 inches in height at the whorl. The addition of

ACCORD® or ROUNDUP® PRO at the rate of 8 to 16 oz per acre may improve control after culm elongation or in dense stands. Use higher herbicide rates as density increases. Larger grass than specified above can be controlled.

**Dallisgrass, Bahiagrass, Vaseygrass, *Paspalum* spp., Smutgrass:**

For dallisgrass, bahiagrass and smutgrass control, apply **Plateau** herbicide postemergence at the rate of 10 to 12 oz per acre, after grass has reached 100% green-up. For dallisgrass and smutgrass, activity may range from suppression to control depending upon grass growth stage and growing conditions at the time of application. For vaseygrass apply **Plateau** at the rate of 4 to 6 oz per acre postemergence after grass has reached 100% green-up and is from 3 to 8 inches in height. The addition of ACCORD® or ROUNDUP® PRO at the rate of 12 to 16 oz per acre will improve efficacy. Use higher herbicide rates as target grass weed densities and/or maturity increase. The addition of PENDULUM® will provide increased preemergence control of these grasses from seed.

**Leafy Spurge:** For best results, apply **Plateau** at 8 to 12 oz per acre in late summer or fall (August through October, but timing may vary by state and/or altitude). Consecutive year applications will optimize long term control. **Plateau** at 12 oz/A applied spring or fall, or 4 oz/A in the spring following an 8 oz/A fall treatment may result in excessive injury to cool season grasses in some areas. For best results, always use a methylated seed oil at 2 pints per acre. Two pints per acre of nitrogen fertilizer (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section) may also be added to the spray tank to increase leafy spurge control, however, this may increase injury to desired species of grasses and forbs. The use of nonionic and silicone based surfactants have resulted in little or no control of leafy spurge. Approximate dates for fall timing in North and South Dakota is late August through September; for Nebraska and Iowa is mid-September through mid-October. This application should be made after good soil moisture is present but prior to the leafy spurge losing its milky sap flow due to a killing frost. To check and see if the milky sap flow has been affected by a frost simply break the main stem of the leafy spurge and if milky sap flows from the break then **Plateau** can still be applied.

**Tall Fescue Control:** Tall fescue can be controlled by using **Plateau** at the rate of 12 oz plus Methylated Seed Oil at 2 pints per acre. The addition of ACCORD, glyphosate or ROUNDUP PRO and/or nitrogen fertilizer (see "SPRAY ADJUVANTS FOR POSTEMERGENCE APPLICATIONS" section) to the above mix will aid in control. Tall fescue must be actively growing for optimum control. If tall fescue has reached summer dormancy, control may be poor.

Fall applications of **Plateau** at 8 to 12 oz/A plus a ACCORD® or ROUNDUP® PRO at 24 to 64 oz/A will result in best control of existing tall fescue and new germinating seedlings. With spring applications of **Plateau** at 6 to 12 oz/A, plus ACCORD or ROUNDUP PRO at 32 to 64 oz/A, use higher rates for older, mature fescue stands and lower **Plateau** rates when planting forbs. When using 8 oz/A of **Plateau** in the fall with ACCORD or ROUNDUP PRO, it is recommended to apply 4 oz/A **Plateau** in the spring at planting for annual weed and seedling fescue control. Burning the fescue stand, where permitted, the following spring, just prior to green-up, will aid in control and provide a better seedbed for planting. Mowing the fescue several times the summer before fall application, will weaken the fescue root system, making it more susceptible to herbicides. Always allow for at least 10 inches of regrowth, following the last mowing before spraying, as both **Plateau** and ROUNDUP products need foliage present for herbicide uptake and satisfactory control.

**Russian Knapweed:** Apply 12 oz/A of **Plateau** plus 1 quart per acre of methylated seed oil during Russian knapweed senescence in the fall. Control improves as senescence progresses and may still be obtained with applications made after full senescence. Applications made prior to the initiation of senescence will result in reduced control.

**Dalmatian Toadflax:** Apply 12 oz/A of **Plateau** plus 1 quart per acre of methylated seed oil in the fall when the top 25% of the plant is necrotic, usually after a hard frost (late October through November). The addition of ammonium sulfate at a rate of 2 to 3 pints per acre may improve control. As long as there is some green stem and/or leaf tissue remaining, good control can be achieved. This timing usually corresponds to fall basal growth. Applications made prior to this will result in poor control.

**Resistant Biotypes:** Naturally occurring biotypes (a plant within a given species that has a slightly different, but distinct genetic

makeup from other plants of the same species) of some weeds listed on this label may not be effectively controlled by this and/or other herbicides (OUST®) with the ALS/AHAS enzyme inhibiting mode of action. If naturally occurring ALS/AHAS resistant biotypes are present in an area, **Plateau** should be tank-mixed or applied sequentially with an appropriate registered herbicide having a different mode of action to ensure control.

## RESIDUAL BAREGROUND WEED CONTROL

For sensitive areas and use around desirable vegetation **Plateau** at 12 ounces per acre may be tank mixed with PENDULUM® herbicide, ROUNDUP® PRO, ESCORT®, KARMEX®, 2,4-D, diuron, ENDURANCE® or other labeled products to provide total vegetation control. For other bareground areas **Plateau** at 12 oz per acre may be tank mixed with ARSENAL® herbicide, SAHARA® DG herbicide, KROVAR®, OUST®, TORDON®, VANQUISH® or other labeled products to provide total bareground weed control. For maximum weed control, use 2 pints per acre of methylated seed oil as an adjuvant.

**Spot Treatments:** **Plateau** may be used to control weed encroachment in bareground or total vegetation control situations. To prepare the spray solution, thoroughly mix in each gallon of water 0.25 to 5% volume/volume (0.3 oz to 5.4 oz per gallon) **Plateau** plus a methylated seed oil adjuvant.

## USE UNDER PAVED SURFACES

Applications should be made to the soil surface only when final grade is established. **DO NOT** move soil following **Plateau** application. Apply **Plateau** in sufficient water to ensure thorough and uniform wetting of the soil surface, including the shoulder area. Add **Plateau** at a rate of 12 oz. per acre to clean water in the spray tank during the filling operation. Agitate before spraying. If soil is not moist prior to treatment, incorporation of **Plateau** will improve control. **Plateau** can be incorporated into the soil to a depth of two inches using a rototiller or disc. Rainfall or irrigation totaling one inch is also sufficient to incorporate **Plateau** into the soil surface. **DO NOT** allow treated soil to wash or move into untreated area.

## CONIFER PLANTATION SITE PREPARATION

**Plateau** may be applied as a site preparation treatment prior to establishing conifer plantations to provide residual weed control of herbaceous weeds. Apply **Plateau** at 12 ozs per acre.

**DO NOT** apply more than 12 ozs per acre per year.

**DO NOT** use in forests. Only for use on sites that are managed as conifer plantations.

## TOLERANCE OF TREES AND BRUSH TO PLATEAU

The following tolerance information is provided as a general guideline when it is desirable or necessary to make **Plateau** applications in and around desirable tree and brush species. **DO NOT** use **Plateau** on nursery, orchard, ornamental plantings, new plantings, seedling trees or fiber farms except as specified on supplemental labeling. It is suggested that **Plateau** be tried on a limited basis to determine tolerance in your area. **Plateau** may be used at rates up to 12 oz per acre for weed control in and around established trees on pasture, rangeland (see "GUIDELINES FOR RANGELAND USE" section) and noncropland areas such as roadsides, prairies and similar areas used for wildlife cover, erosion control, wind breaks, etc. Tree and brush species known to have acceptable tolerance to **Plateau** when applied under the canopy and/or to the foliage are listed below. Tolerance is based upon trees with a minimum of 2 inch DBH. Application to tree and brush species that are under stress due to drought, disease, insect damage or other factors may be more susceptible to injury from **Plateau** and may result in severe injury or death. Some species may exhibit tip chlorosis and minor necrosis. Foliar contact may increase injury to include defoliation and terminal death. Application methods that minimize foliar contact with desirable tree and brush species can improve tolerance.

When making fall applications of **Plateau**, potential injury to tree and brush species from foliar contact may be minimized by making the application after the leaves have begun to senesce (fall color) or after leaf drop. Conifer species are generally tolerant to fall applications. **Plateau** applications in and around tree and brush species should be made at the recommended timing for the target weed species.

**Brush and Tree Species Tolerance to Plateau® herbicide at 12 oz per Acre<sup>1</sup>**

Common Name	Genus Species	Tolerance by Application Method <sup>2</sup>		
		Directed Below Foliage	To Foliage	
Apple (Var. Winesap) <sup>3</sup>	<i>Malus sylvestris</i>	Yes	NR	
Ash, Blue	<i>Fraxinus quadrangulata</i>	Yes	NR	
Ash, Green	<i>Fraxinus pennsylvanica</i>	No	No	
Azalea	<i>Rhododendron</i> spp.	No	No	
Basswood	<i>Tilia heterophylla</i>	No	No	
Boxelder	<i>Acer negundo</i>	Yes	Injury <sup>5</sup>	
Buckeye, Ohio	<i>Aesculus glabra</i>	Yes	NR	
Cedar-juniper, Western	<i>Thuja plicata</i>	Yes	Yes	
Cherry, Black <sup>3</sup>	<i>Prunus serotina</i>	No	No	
Cherry, Choke	<i>Prunus virginiana</i>	No	No	
Cherry, Sweet <sup>3</sup>	<i>Prunus avium</i>	No	NR	
Cottonwood	<i>Populus deltoides</i>	Yes	Injury <sup>5</sup>	
Cottonwood, narrow leaf	<i>Populus</i> spp.	Yes	Injury <sup>5</sup>	
Currant species	<i>Ribes</i> spp.	Injury <sup>5</sup>	No	
Dogwood, Flowering	<i>Cornus</i> spp.	Yes	Yes	
Dogwood, Grey	<i>Cornus racemosa</i>	Yes	Injury <sup>5</sup>	
Dogwood, Red Trig	<i>Cornus</i> spp.	Yes	Yes	
Douglas Fir	<i>Pseudotsuga menziesii</i>	Yes	Yes <sup>4</sup>	
Elm, American	<i>Ulmus americana</i>	Yes	Yes	
Elm, Siberian	<i>Ulmus pumila</i>	Yes	No	
Elm, Slippery	<i>Ulmus rubra</i>	Yes	Yes	
Gooseberry	<i>Ribes</i> spp.	Injury <sup>5</sup>	Injury <sup>5</sup>	
Hackberry	<i>Celtis occidentalis</i>	Yes	Yes	
Hawthorn	<i>Crataegus</i> spp.	Yes	Injury <sup>5</sup>	
Juniper, Chinese	<i>Juniperus chinensis</i>	Yes	Yes	
Juniper, Western	<i>Juniperus osteosperma</i>	Yes	Yes	
Lilac	<i>Syringa</i> spp.	No	No	
Linden, American	<i>Tilia americana</i>	No	No	
Locust, Black	<i>Robinia pseudoacacia</i>	Yes	Yes	
Locust, Honey	<i>Gleditsia triacanthos</i>	Yes	Yes	
Maple, Red	<i>Acer rubrum</i>	Yes	Yes	
Maple, Sugar	<i>Acer saccharum</i>	Yes	Yes	
Mulberry, Red	<i>Morus rubra</i>	Yes	NR	
Mulberry, White	<i>Morus alba</i>	Yes	NR	
Oak, Black	<i>Quercus velutina</i>	Yes	NR	
Oak, Live	<i>Quercus virginiana</i>	Yes	Yes	
Oak, Southern Red	<i>Quercus falcata</i>	Yes	NR	
Oak, White	<i>Quercus alba</i>	Yes	NR	
Olive, Russian	<i>Elaeagnus angustifolia</i>	Yes	No	
Osage Orange	<i>Maclura pomifera</i>	Yes	NR	
Peach (Var. Elberta) <sup>3</sup>	<i>Prunus persica</i>	Yes	NR	
Photinia, Red Tip	<i>Photinia fraseri</i>	Yes	Yes	
Pine, Lodgepole	<i>Pinus contorta</i>	Yes	Injury <sup>4</sup>	
Pine, White <sup>4</sup>	<i>Pinus strobus</i>	Yes	Yes	
Pittosporum, Japanese	<i>Pittosporum tobira</i>	Yes	Yes	
Plum species	<i>Prunus</i> spp.	Yes	No	
Poplar, Yellow (Tulip)	<i>Liriodendron tulipifera</i>	Yes	NR	
Privet, Common	<i>Ligustrum vulgare</i>	Yes	Yes	
Rabbitbrush species	<i>Chrysothamnus</i> spp.	Yes	Yes	
Redbud	<i>Cercis canadensis</i>	Yes	Yes	
Redcedar, Eastern	<i>Juniperus virginiana</i>	Yes	Yes	
Rose, Multiflora	<i>Rosa multiflora</i>	Yes <sup>5</sup>	No	
Sage, Big	<i>Artemisia tridentata</i>	Yes	Yes	
Sage, Fringe	<i>Artemisia frigida</i>	Yes	Yes	
Sage, Silver	<i>Artemisia cana</i>	Yes	Yes	
Sagebrush, Big	<i>Artemisia tridentata</i>	Yes	Yes	

**Brush and Tree Species Tolerance to Plateau at 12 oz per Acre<sup>1</sup> (CONT):**

Common Name	Genus Species	Tolerance by Application Method <sup>2</sup>	
		Directed Below Foliage	To Foliage
Sagebrush, Fringed	<i>Artemisia frigida</i>	Yes	Yes
Saltcedar	<i>Tamarix</i> spp.	Yes	No
Serviceberry	<i>Amelanchier alnifolia</i>	Yes	NR
Snowberry, Western	<i>Symphoricarpos occidentalis</i>	Yes	Injury <sup>5</sup>
Spruce species	<i>Picea</i> spp.	Yes <sup>4</sup>	Yes <sup>4</sup>
Sugarberry	<i>Celtis laevigata</i>	Yes	Yes
Sweetgum	<i>Liquidambar styraciflua</i>	Yes	Yes <sup>6</sup>
Sycamore	<i>Platanus occidentalis</i>	Yes	No
Tree-of-Heaven	<i>Ailanthus altissima</i>	Yes	Yes
Walnut, American Black	<i>Juglans nigra</i>	Yes	No
Willow	<i>Salix</i> spp.	Yes	Injury <sup>5</sup>

<sup>1</sup> Not intended for nursery, orchard, ornamental plantings, new plantings or seedling trees.

<sup>2</sup> Yes = Tolerant

No = Not Tolerant, Severe injury or death

NR = Not Recommended due to insufficient tolerance data

<sup>3</sup> Not for use on ornamental or fruit bearing trees.

<sup>4</sup> Applications made just before or during candling may cause candle injury or death.

<sup>5</sup> Possible defoliation and/or death. Some species may exhibit tip chlorosis and minor necrosis. If spray contacts foliage then defoliation and terminal death may occur. Injury can be reduced or eliminated if applied in fall after color change or leaf drop.

<sup>6</sup> See supplemental label, "For Use In Sweetgum (*Liquidambar styraciflua*) Grown on Fiber Farms."

**WEEDS CONTROLLED**

(Not for use in California unless directed otherwise in supplemental labeling.)

**Plateau, 4 to 6 oz per acre**

Common Name	Genus Species	Annual/ Biennial/ Perennial <sup>3</sup>			
		PRE <sup>1</sup>	POST <sup>2</sup>		
<b>BROADLEAVES</b>					
Bedstraw, Catchweed	<i>Galium aparine</i>	C	4	WA	
Beggarteed, Florida	<i>Desmodium tortuosum</i>	C	2	SA	
Buffalobur	<i>Solanum rostratum</i>	—	C	SA	
Buttercup, Bur	<i>Ranunculus testiculatus</i>	C	C	WA	
Cocklebur, Common	<i>Xanthium strumarium</i>	S	6	SA	
Lambsquarters, Common	<i>Chenopodium album</i>	C	2	SA	
Halogenon	<i>Halogenon glomeratus</i>	C	C	SA	
Morningglory					
Entireleaf	<i>Ipomoea hederacea</i>	S	3	SA	
Ivyleaf	<i>Ipomoea hederacea</i>	S	3	SA	
Tall	<i>Ipomoea purpurea</i>	S	3	SA	
Mustard, Garlic	<i>Alliaria petiolata</i>	C	C	SA	
Mustard, Wild	<i>Brassica kaber</i>	C	C	WA	
Pigweed	<i>Amaranthus</i> sp.	C	6	SA	
Queen Anne's Lace	<i>Daucus carota</i>	—	4	B	
Radish, Wild	<i>Raphanus raphanistrum</i>	S	4	WA	
Yellow Rocket	<i>Barbara vulgaris</i>	C	4	WA	
Sicklepod	<i>Senna obtusifolia</i>	C	4	SA	
Sida, Prickly	<i>Sida spinosa</i>	C	2	SA	
Smartweed					
Lady's thumb, Pennsylvania	<i>Polygonum persicaria</i>	C	C	SA	
Swamp	<i>Polygonum pensylvanicum</i>	C	C	SA	
Starbur, Bristly	<i>Polygonum coccineum</i>	C	C	SA	
Velvetleaf	<i>Acanthospermum hispidum</i>	C	2	SA	
	<i>Abutilon theophrasti</i>	C	6	SA	

Plateau® herbicide, 4 to 6 oz per acre (CONT):

Common Name	Genus Species	Annual/ Biennial/ Perennial <sup>3</sup>		
				PRE <sup>1</sup> POST <sup>2</sup>
<b>GRASS WEEDS</b>				
Brome, Downy	<i>Bromus tectorum</i>	C	—	WA
Cheat	<i>Bromus secalinus</i>	C	—	WA
Crabgrass				
Large (Hairy)	<i>Digitaria sanguinalis</i>	C	4	SA
Smooth	<i>Digitaria ischaemum</i>	C	4	SA
Foxtail,				
Giant	<i>Setaria faberii</i>	C	6	SA
Green	<i>Setaria viridis</i>	C	4	SA
Yellow	<i>Setaria glauca</i>	C	4	SA
Goatgrass, Jointed	<i>Aegilops cylindrica</i>	C	C	WA
Goosegrass	<i>Elusine indica</i>	S	2	SA
Johnsongrass (Seedling)	<i>Sorghum halepense</i>	C	12	SA
Medusahead	<i>Taeniatherum caput-medusae</i>	C	2	WA
Panicum, Fall	<i>Panicum dichotomiflorum</i>	S	6	SA
Sandbur	<i>Cenchrus sp.</i>	S	C	A/P
Shattercane	<i>Sorghum bicolor</i>	C	12	SA
Signalgrass, Broadleaf	<i>Bracharia platyphylla</i>	C	C	SA
Stiltgrass, Japanese	<i>Microstegium vimineum</i>	C	4	A
Vaseygrass	<i>Paspalum urvillei</i>	—	8	P
<b>SEDGES</b>				
Nutsedge				
Yellow	<i>Cyperus esculentus</i>	S	4S	P
Purple	<i>Cyperus rotundus</i>	S	4S	P
Sedge	<i>Juncus sp.</i>	S	4S	A/P

<sup>1</sup>C = control, S = suppression in northern United States only

<sup>2</sup>Maximum plant height in inches at time of application

<sup>3</sup>Growth habit: A=Annual, SA=Summer Annual, WA=Winter Annual, B=Biennial  
P=Perennial

Plateau, 8 to 12 oz per acre (CONT):

Common Name	Genus Species	Annual/ Biennial/ Perennial <sup>3</sup>		
				PRE <sup>1</sup> POST <sup>2</sup>
<b>BROADLEAVES</b>				
Houndstongue, Bristly	<i>Cynoglossum officinale</i>	C	C	B
Indigo, Hairy	<i>Indigofera hirsuta</i>	C	2	P
Jimsonweed	<i>Datura stramonium</i>	C	6	SA
Knapweed, Russian <sup>5</sup>	<i>Centaurea repens</i>	—	C*	P
Knotweed, Prostrate	<i>Polygonum aviculare</i>	C	C	SA
Kochia*	<i>Kochia scoparia</i>	C	3	SA
Lambsquarters, Common	<i>Chenopodium album</i>	C	3	SA
Morningglory				
Cypressvine	<i>Ipomoea quamoclit</i>	C	6	SA
Entireleaf	<i>Ipomoea hederacea</i>	C	6	SA
Ivyleaf	<i>Ipomoea hederacea</i>	C	6	SA
Pitted	<i>Ipomoea lacunosa</i>	C	6	SA
Smallflower	<i>Jacquemontia tamnifolia</i>	C	6	SA
Tall	<i>Ipomoea purpurea</i>	C	6	SA
Mustard, Wild	<i>Brassica kaber</i>	C	C	WA
Onion, Wild	<i>Allium canadense</i>	C	C	P
Pepperweed, Perennial	<i>Lepidium latifolium</i>	—	C	P
Pigweed <sup>1</sup>	<i>Amaranthus sp.</i>	C	6	SA
Plantain, Narrowleaf	<i>Plantago lanceolata</i>	C	C	B
Poinsettia, Wild	<i>Euphorbia heterophylla</i>	C	6	SA
Puncture Vine	<i>Tribulus terrestris</i>	—	C	SA
Purslane, Common	<i>Portulaca oleracea</i>	C	4	SA
Pusley, Florida	<i>Richardia scabra</i>	C	4	SA
Queen Anne's Lace	<i>Daucus carota</i>	C	C	B
Ragweed				
Common	<i>Ambrosia artemisiifolia</i>	C	3	SA
Giant	<i>Ambrosia trifida</i>	S	6	SA
Western	<i>Ambrosia psilostachya</i>	—	C	A/P
Rocket, Yellow	<i>Barbarea vulgaris</i>	C	C	WA
Senna, Coffee	<i>Cassia occidentalis</i>	C	4	SA
Sicklepod	<i>Senna obtusifolia</i>	C	6	SA
Sida, Prickly	<i>Sida spinosa</i>	C	6	SA
Smartweed				
Lady'sthumb	<i>Polygonum persicaria</i>	C	C	SA
Pennsylvania	<i>Polygonum pensylvanicum</i>	C	C	SA
Swamp	<i>Polygonum coccineum</i>	C	C	SA
Spurge				
Leafy	<i>Euphorbia esula</i>	—	FALL*	P
Spotted	<i>Euphorbia maculata</i>	C	4	SA
Toothed	<i>Euphorbia dentata</i>	C	4	SA
Starbur, Bristly	<i>Acanthospermum hispidum</i>	—	6	SA
Sunflower	<i>Helianthus annuus</i>	—	18	SA
Tansymustard	<i>Descurainia pinnata</i>	C	C	WA
Teasel, Common	<i>Dipsacus fullonum</i>	—	C	B
Thistle				
Bull	<i>Cirsium vulgare</i>	S	C	WA/B
Musk	<i>Carduus nutans</i>	S	C	B
Platt	<i>Cirsium canescens</i>	S	C	P
Russian*	<i>Salsola iberica</i>	C	3	A
Toadflax, Dalmatian	<i>Linaria dalmatica</i>	—	C*	P
Velvetleaf	<i>Abutilon theophrasti</i>	C	C	A
Vervain, Blue	<i>Verbena hastata</i>	—	S	WA
Vervain, prostrate	<i>Verbena bracteata</i>	—	C	P
Whitetop	<i>Cardaria spp.</i>	—	C	P
Willowherb	<i>Epilobium spp.</i>	—	C	P
Woodsorrel, Yellow	<i>Oxalis stricta</i>	C	C	P

Plateau, 8 to 12 oz per acre

Common Name	Genus Species	Annual/ Biennial/ Perennial <sup>3</sup>		
				PRE <sup>1</sup> POST <sup>2</sup>
<b>BROADLEAVES</b>				
Anoda, Spurred	<i>Anoda cristata</i>	C	6	SA
Baby's Breath <sup>6</sup>	<i>Gypsophila paniculata</i>	—	C	P
Bedstraw, Catchweed	<i>Galium aparine</i>	C	C	WA
Bedstraw, Marsh	<i>Galium spp.</i>	C	C	WA
Beggarweed, Florida	<i>Desmodium tortuosum</i>	C	6	SA
Bindweed, Field	<i>Convolvulus arvensis</i>	—	C	P
Buffalobur	<i>Solanum rostratum</i>	—	C	SA
Burclover	<i>Medicago sp.</i>	—	4	SA
Chickweed, Common	<i>Stellaria media</i>	C	6	SA
Cocklebur, Common	<i>Xanthium strumarium</i>	C	6	SA
Cornsalad, Common	<i>Valerianella locusta</i>	—	C	WA
Crownbeard, Golden	<i>Verbena encelioides</i>	C	2	SA
Dandelion	<i>Taraxacum officinale</i>	—	C	P
Dock, Curly	<i>Rumex crispus</i>	C	6	B
Fiddleneck	<i>Amsinckia sp.</i>	—	C	SA
Flax, Spurge	<i>Thymelaea passerina</i>	C	C	A
Fleabane, Annual	<i>Erigeron annuus</i>	—	C	A
Geranium, Carolina	<i>Geranium carolinianum</i>	—	C	WA/B
Geranium, Cranesbill	<i>Geranium maculatum</i>	C	C	WA/B
Ground Cherry	<i>Physalis heterophylla</i>	—	C	P
Hemlock, Poison	<i>Conium maculatum</i>	C	6	B
Henbit	<i>Lamium amplexicaule</i>	C	3	WA/B

**Plateau® herbicide, 8 to 12 oz per acre (CONT):**

Common Name	Genus Species	PRE <sup>1</sup>	POST <sup>2</sup>	Annual/ Biennial/ Perennial <sup>3</sup>
<b>GRASS</b>				
Bahiagrass	<i>Paspalum nutatum</i>	S	C*	P
Barley, Little	<i>Hordeum pusillum</i>	C	4	WA
Barley, Squirrel Tail	<i>Hordeum jubatum</i>	—	C	P
Barnyardgrass	<i>Echinochloa crus-galli</i>	C	6	SA
Canarygrass, Reed	<i>Phalaris arundinacea</i>	—	C	P
Cheat	<i>Bromus secalinus</i>	C	—	WA
Crabgrass	<i>Digitaria</i> sp.	C	6	SA
Crowfootgrass	<i>Dactyloctenium aegyptium</i>	C	C	SA
Dallisgrass	<i>Paspalum dilatatum</i>	S	C*	P
Downy Brome	<i>Bromus tectorum</i>	C	—	WA
Dropseed, Tall	<i>Sporobolus cryptandrus</i>	S	C	A/P
Fescue, Tall	<i>Festuca arundinacea</i>	C	C*	P
Foxtail				
Giant	<i>Setaria faberii</i>	C	C	SA
Green	<i>Setaria viridis</i>	C	C	SA
Knotroot	<i>Setaria geniculatus</i>	S	6	SA
Purple Robust	<i>Setaria viridis</i>	S	S	SA
Yellow	<i>Setaria glauca</i>	C	4	SA
Garlic, Wild	<i>Allium vineale</i>	C	C	P
Goosegrass	<i>Erysimum indica</i>	C	3S	SA
Itchgrass	<i>Rottboellia cochinchinensis</i>	—	C*	SA
Johnsongrass				
Seedling	<i>Sorghum halepense</i>	C	C	SA
Rhizome	<i>Sorghum halepense</i>	—	C*	P
Medusahead	<i>Taeniatherum caput-medusae</i>	C	C	WA
Panicum				
Fall	<i>Panicum dichotomiflorum</i>	C	C	SA
Texas	<i>Panicum texanum</i>	C	C	SA
Ryegrass, Annual (Italian)	<i>Lolium multiflorum</i>	C	C	WA
Ryegrass, Perennial	<i>Lolium perenne</i>	—	C	P
Sandbur	<i>Cenchrus</i> sp.	S	C	A/P
Shattercane	<i>Sorghum bicolor</i>	C	C	SA
Signalgrass, Broadleaf	<i>Brachiaria platyphylla</i>	C	C	SA
Smutgrass	<i>Sporobolus indicus</i>	—	C	P
Stiltgrass, Japanese	<i>Microstegium vimineum</i>	C	C	A
Stinkgrass, Annual	<i>Eragrostis ciliaris</i>	C	2	SA
Torpedograss	<i>Panicum repens</i>	—	C	P
Vaseygrass	<i>Paspalum urvillei</i>	C	P	
Wild Oats	<i>Avena fatua</i>	—	C	WA
<b>SEDGES/RUSHES</b>				
Nutssedge				
Yellow	<i>Cyperus esculentus</i>	C	C	P
Purple	<i>Cyperus rotundus</i>	C	C	P
Rush	<i>Juncus</i> sp.	S	4	A/P

<sup>1</sup>C = control, S = suppression

<sup>2</sup>Maximum plant height in inches at time of application

<sup>3</sup>Growth habit: A=Annual, SA=Summer Annual, WA=Winter Annual, B=Biennial  
P=Perennial

\*Some species are tolerant and resistant biotypes are possible.

<sup>5</sup>For annual control. The addition of 1-2 pints of 2,4-D will aid in burndown.

<sup>6</sup>For best control apply in the fall.

<sup>7</sup>See "SPECIAL WEED CONTROL" section

## Conditions of Sale and Warranty

The **Directions For Use** of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and must be followed carefully. However, it is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or use of the product in a manner inconsistent with its labeling, all of which are beyond the control of BASF CORPORATION ("BASF") or the Seller. To the extent consistent with applicable law, all such risks shall be assumed by the Buyer.

BASF warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the **Directions For Use**, subject to the inherent risks, referred to above.

To the extent consistent with applicable law, BASF makes no other express or implied warranty of fitness or merchantability or any other express or implied warranty.

To the extent consistent with applicable law, Buyer's exclusive remedy and BASF's exclusive liability, whether in contract, tort, negligence, strict liability, or otherwise, shall be limited to repayment of the purchase price of the product.

To the extent consistent with applicable law, BASF and the Seller disclaim any liability for consequential, special or indirect damages resulting from the use or handling of this product.

BASF and the Seller offer this product, and the Buyer and User accept it, subject to the foregoing **Conditions of Sale and Warranty** which may be varied only by agreement in writing signed by a duly authorized representative of BASF.

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## USES WITH OTHER PRODUCTS (TANK-MIXES)

If this product is used in combination with any other product except as specifically recommended in writing by BASF, then to the extent consistent with applicable law, BASF shall have no liability for any loss, damage, or injury arising out of its use in any such combination not so specifically recommended. If used in combination recommended by BASF, to the extent consistent with applicable law, the liability of BASF shall in no manner extend to any damage, loss or injury not directly caused by the inclusion of the BASF product in such combination use, and in any event, to the extent consistent with applicable law, shall be limited to return of the amount of the purchase price of the BASF product.

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BASF Corporation  
26 Davis Drive  
Research Triangle Park, NC 27709



The Chemical Company

# Specimen Label



## Rodeo®

### Herbicide

For control of annual and perennial weeds and woody plants in forests, non-crop sites, and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

Avoid contact of herbicide with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees, because severe injury or destruction may result.

#### Active Ingredient(s):

glyphosate <sup>1</sup> N-(phosphonomethyl)glycine,	53.8%
isopropylamine salt .....	
Inert Ingredients .....	46.2%
Total Ingredients .....	100.0%

<sup>1</sup> Contains 5.4 pounds per gallon glyphosate, isopropylamine salt (4 pounds per gallon glyphosate acid).

EPA Reg. No. 62719-324

#### Keep Out of Reach of Children

### CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

### PRECAUCION

#### Precautionary Statements

#### Hazards to Humans and Domestic Animals

##### Harmful If Inhaled

Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.

#### Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE (Personal Protective Equipment). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

#### Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

#### User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

#### First Aid

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

#### Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of leak or spill, soak up and remove to a landfill.

#### Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

Do not mix, store or apply this product or spray solutions of this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas, which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

**Notice:** Read the entire label. Use only according to label directions. Before using this product, read Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies elsewhere on this label. If terms are unacceptable, return at once unopened.

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at [www.dowagro.com](http://www.dowagro.com).

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

### Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

**This is an end-use product. Dow AgroSciences does not intend and has not registered it for reformulation. See individual container label for repackaging limitations.**

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

### Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

### Storage and Disposal

Do not contaminate water, food, feed or seed by storage or disposal.

**Pesticide Storage: Store above 10°F (-12°C) to keep product from crystallizing.** Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68°F (20°C) for several days to redissolve and roll or shake container or recirculate in mini-bulk containers to mix well before using.

**Pesticide Disposal:** Wastes resulting from use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

**Container Disposal:** Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. Do not reuse this container. Triple rinse (or equivalent). Then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

### General Information (How this product works)

This product is a water-soluble liquid, which mixes readily with water and nonionic surfactant to be applied as a foliar spray for the control or destruction of many herbaceous and woody plants. This product is intended for control of annual and perennial weeds and woody plants in forests, pine straw plantations, non-crop sites such as utility rights-of-way, and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

The active ingredient in this product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days, 7 days or more on most perennial weeds, and 30 days or more on most woody plants. Extremely cool or cloudy weather following treatment may slow the activity of this product and delay visual effects of control. Visible effects include gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts.

Unless otherwise directed on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the "Weeds Controlled" section of this label.

Unemerged plants arising from unattached underground rhizomes or root stocks of perennials or brush will not be affected by the spray and will continue to grow. For this reason best control of most perennial weeds or brush is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product and surfactant within the recommended range when vegetation is heavy or dense, when treating dense multi-canopied sites or woody vegetation or difficult-to-control herbaceous or woody plants.

Do not treat weeds, brush or trees under poor growing conditions such as drought stress, disease or insect damage, as reduced control may result. Reduced control of target vegetation may also occur if foliage is heavily covered with dust at the time of treatment.

Reduced control may result when applications are made to woody plants or weeds following site disturbance or plant top growth removal from grazing, mowing, logging or mechanical brush control. For best results, delay treatment of such areas until resprouting and foliar growth has restored the target vegetation to the recommended stage of growth for optimum herbicide exposure and control.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application may wash the product off the foliage and a repeat treatment may be required.

This product does not provide residual weed control. For subsequent residual weed control, follow a label-approved herbicide program. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

**Note:** The maximum rates stated throughout this product's labeling apply to this product combined with the use of all other herbicides containing glyphosate or sulfosate as the active ingredient, whether applied as mixtures or separately. Calculate the application rates and ensure that the total use of this and other glyphosate or sulfosate containing products does not exceed the maximum use rates.

**Grazing Restrictions:** This product may be used to treat undesirable vegetation in utility rights-of-way that pass through pastures, rangeland, and forestry sites that are being grazed. For tank mix applications, comply with all restrictions appearing on the tank mix product label.

Except for lactating dairy animals there are no grazing restrictions following the labeled applications of this product.

- For lactating dairy animals there are no grazing restrictions for the following labeled applications of this product:
  - ▶ Where the spray can be directed onto undesirable woody brush and trees, such as in handgun spray-to-wet or low volume directed spray treatments.
  - ▶ For tree injection of frill applications and for cut stump treatments
- For broadcast applications, observe the following restrictions for lactating dairy animals:
  - ▶ For application rates of greater than 4.5 but not to exceed 7.5 quarts per acre, no more than 15 percent of the available grazing area may be treated.
  - ▶ For application rates that do not exceed 4.5 quarts per acre, no more than 25 percent of the available grazing area may be treated.
- These restrictions do not apply to pastures, rangeland or forestry sites outside of utility rights-of-way.

**NOTE:** Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. When not in use, keep container closed to prevent spills and contamination.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product or other materials that are not expressly recommended in this label. Mixing this product with herbicides or other materials not recommended in this label may result in reduced performance.

**ATTENTION: Avoid drift. Extreme care must be used when applying this product to prevent injury to desirable plants and crops.**

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. **Avoid applying at excessive speed or pressure.**

## Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees. Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following **Aerial Drift Reduction Advisory Information:**

**Importance of Droplet Size:** The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversion section of this label).

**Controlling Droplet Size:** Volume-Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.

Pressure-Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.

Number of nozzles-Use the minimum number of nozzles that provide uniform coverage.

Nozzle Orientation-Orienting nozzles so that the spray is released backwards, parallel to the airstream will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.

Nozzle Type-Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce larger droplets than other nozzle types.

Boom Length-For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application-Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

**Swath Adjustment:** When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

**Wind:** Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift.

**Temperature and Humidity:** When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

**Temperature Inversions:** Applications should not occur during a temperature inversion, because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a connected cloud (under low wind conditions) indicates an inversion, while smoke that moves upwards and rapidly dissipates indicates good vertical air mixing.

**Sensitive Areas:** The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

### **Mixing And Application Instructions**

**Apply these spray solutions in properly maintained and calibrated equipment capable of delivering desired volumes. Hand-gun applications should be properly directed to avoid spraying desirable plants. Note: reduced results may occur if water containing soil is used, such as water from ponds and unlined ditches.**

#### **Mixing**

This product mixes readily with water. Mix spray solutions of this product as follows:

1. Fill the mixing or spray tank with the required amount of water while adding the required amount of this product (see "Directions for Use" and "Weeds Controlled" sections of this label).
2. Near the end of the filling process, add the required surfactant and mix well. Remove hose from tank immediately after filling to avoid siphoning back into the water source.

**Note:** If tank mixing with Garlon® 3A herbicide, ensure that Garlon 3A is well mixed with at least 75 percent of the total spray volume before adding this product to the spray tank to avoid incompatibility.

During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, place the filling hose below the surface of the spray solution (only during filling), terminate by-pass and return lines at the bottom of the tank, and, if needed, use an approved anti-foam or defoaming agent.

Keep by-pass line on or near bottom of tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50 mesh. Carefully select correct nozzle to avoid spraying a fine mist. For best results with conventional ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

**IMPORTANT:** When using this product, unless otherwise specified, mix with a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. For conifer release (pine release) use only surfactants that are approved for conifer release, and specified on the surfactant label as safe for use in conifer release (pine release).

Always read and follow the manufacturer's surfactant label recommendations for best results.

Colorants or marking dyes approved for use with herbicides may be added to spray mixtures of this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilutions. Use colorants or dyes according to the manufacturer's label recommendations.

Clean sprayer and parts immediately after using this product by thoroughly flushing with water and dispose of rinsate according to labeled use or disposal instructions.

Carefully observe all cautionary statements and other information appearing in the surfactant label.

### **Application Equipment And Techniques**

**ATTENTION: AVOID DRIFT. EXTREME CARE MUST BE EXERCISED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.**

Do not allow the herbicide solution to mist, drip, drift, or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to crops, plants, or other areas on which the treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

**Note:** Use of this product in a manner not consistent with this label may result in injury to persons, animals, or crops, or other unintended consequences. When not in use, keep container closed to prevent spills and contamination.

## Aerial Equipment

**For aerial application of this product in California, refer to Federal supplemental label for this product entitled "For Aerial Application in California Only".** In California, aerial application may be made in aquatic sites and noncrop areas, including aquatic sites present in noncrop areas that are part of the intended treatment.

**For control of weed or brush species listed in this label using aerial application equipment:** For aerial broadcast application, unless otherwise specified, apply the rates of this product and surfactant recommended for broadcast application in a spray volume of 3 to 20 gallons of water per acre. See the "Weeds Controlled" section of this label for labeled annual and herbaceous weeds and woody plants and broadcast rate recommendations. Aerial applications of this product may only be made as specifically recommended in this label.

**AVOID DRIFT.** Do not apply during inversion conditions, when winds are gusty or under any other condition which will allow drift. Drift may cause damage to any vegetation contacted to which treatment is not intended. To prevent injury to adjacent desirable vegetation, appropriate buffer zones must be maintained.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure.

Drift control additives may be used. When a drift control additive is used, read and carefully observe the cautionary statements and all other information appearing in the additive label. The use of a drift control agent for conifer and herbaceous release applications may result in conifer injury and is not recommended.

**Ensure uniform application.** To avoid streaked, uneven or overlapped application, use appropriate marking devices.

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. **Prolonged exposure of this product to uncoated steel surfaces may result in corrosion and possible failure of the part.** **Landing gear are most susceptible.** The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

## Ground Broadcast Equipment

**For control of weed or brush species listed in this label using conventional boom equipment:** For ground broadcast application, unless otherwise specified, apply the rates of this product and surfactant recommended for broadcast application in a spray volume of 3 to 30 gallons of water per acre. See the "Weeds Controlled" section of this label for labeled annual and herbaceous weeds and woody plants and broadcast rate recommendations. As density of vegetation increases, spray volume should be increased within the recommended range to ensure complete coverage. Carefully select correct nozzle to avoid spraying a fine mist. For best results with ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

**Forestry and Utility Rights-of-Way Sites:** This product is recommended for broadcast applications using suitable ground equipment in forestry sites, utility sites, and utility rights-of way. Apply the recommended rates of this product and surfactant in a spray volume of 10 to 60 gallons per acre. Check for even distribution of spray droplets.

## Hand-Held and High-Volume Equipment (Use Coarse Sprays Only)

**For control of weeds listed in this label using knapsack sprayers or high-volume spraying equipment utilizing handguns or other suitable nozzle arrangements:**

**High volume sprays:** Prepare a **3/4 to 2 percent solution** of this product in water, add a nonionic surfactant and apply to foliage of vegetation to be controlled. For specific rates of application and instructions for control of various annual and perennial weeds, see the "Weeds Controlled" section in this label.

Applications should be made on a spray-to-wet basis. Spray coverage should be uniform and complete. Do not spray to point of runoff.

**Low volume directed sprays:** This product may be used as a **5 to 10 percent solution** in low-volume directed sprays for spot treatment of trees and brush. This treatment method is most effective in areas where there is a low density of undesirable trees or brush. If a straight stream nozzle is used, start the application at the top of the targeted vegetation and spray from top to bottom in a lateral zig-zag motion. Ensure that at least 50 percent of the leaves are contacted by the spray solution. For flat fan and cone nozzles and with hand-directed mist blowers, mist the application over the foliage of the targeted vegetation. Small, open-branched trees need only be treated from one side. If the foliage is thick or there are multiple root sprouts, applications must be made from several sides to ensure adequate spray coverage.

Prepare the desired volume of spray solution by mixing the amount of this product in water, shown in the following table:

## Spray Solution

Desired Volume	Amount of this product							
	3/4%	1%	1 1/4%	1 1/2%	2%	5%	8%	10%
1 gal	1 fl oz	1 1/3 fl oz	1 2/3 fl oz	2 fl oz	2 2/3 fl oz	6 1/2 fl oz	10 1/4 fl oz	12 3/4 fl oz
25 gal	1 1/2 pt	1 qt	1 1/4 qt	1 1/2 qt	2 qt	5 qt	2 gal	2.5 gal
100 gal	3 qt	1 gal	1 1/4 gal	1 1/2 gal	2 gal	5 gal	8 gal	10 gal

2 tablespoons = 1 fluid ounce

For use in knapsack sprayers, it is suggested that the recommended amount of this product be mixed with water in a larger container. Fill the knapsack sprayer with the mixed solution and add the correct amount of surfactant.

## Selective Equipment

This product may be applied through shielded sprayers or wiper application equipment. This equipment may be used to selectively control undesirable vegetation without harming desirable vegetation.

Shielded sprayers direct the herbicide solution onto weeds while shielding desirable vegetation from the spray solution. Any recommended rate or tank mixture of this product may be used employing this equipment.

Wiper applicators physically wipe product directly onto undesirable vegetation. Care should be taken to avoid wiping desirable vegetation. Use a 33 to 100 percent solution of this product, diluted in water for wiper applications. Use a 33 percent solution for wick or gravity feed systems. Higher concentrations may be used in pressurized systems that are capable of handling thicker solutions. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

## Weeds Controlled

### Annual Weeds

Apply to actively growing annual grasses and broadleaf weeds.

Allow at least 3 days after application before disturbing treated vegetation. After this period the weeds may be mowed, tilled or burned. See "Directions for Use," "General Information" and "Mixing and Application Instructions" for labeled uses and specific application instructions.

**Broadcast Application Rates:** For weeds less than 6 inches tall, use 1 1/2 pints of this product per acre plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. If weeds are greater than 6 inches tall, use 2 1/2 pints of this product per acre plus a non-ionic surfactant containing 80% or greater active ingredient..

**Hand-Held, High-Volume Application Rates:** Use a 3/4 percent solution of this product in water plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Apply to foliage of vegetation to be controlled.

When applied as directed, this product plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient will control the following annual weeds:

Common Name	Scientific Name
Balsamapple <sup>†</sup>	<i>Momordica charantia</i>
Barley	<i>Hordeum vulgare</i>
Barnyardgrass	<i>Echinochloa crus-galli</i>
Bassia, fivehook	<i>Bassia hyssopifolia</i>
Bluegrass, annual	<i>Poa annua</i>
Bluegrass, bulbous	<i>Poa bulbosa</i>
Brome	<i>Bromus spp.</i>
Buttercup	<i>Ranunculus spp.</i>
Cheat	<i>Bromus secalinus</i>
Chickweed, mouseear	<i>Cerastium vulgatum</i>
Cocklebur	<i>Xanthium strumarium</i>
Corn, volunteer	<i>Zea mays</i>
Crabgrass	<i>Digitaria spp.</i>
Dwarfandelion	<i>Krigia cespitosa</i>
Falseflax, smallseed	<i>Camelina microcarpa</i>
Fiddleneck	<i>Amsinckia spp.</i>
Flaxleaf fleabane	<i>Conyza bonariensis</i>
Fleabane	<i>Erigeron spp.</i>
Foxtail	<i>Setaria spp.</i>
Foxtail, Carolina	<i>Alopecurus carolinianus</i>
Groundsel, common	<i>Senecio vulgaris</i>
Horseweed/Marestail	<i>Conyza canadensis</i>
Kochia	<i>Kochia scoparia</i>
Lambsquarters, common	<i>Chenopodium album</i>
Lettuce, prickly	<i>Lactuca serriola</i>
Morningglory	<i>Ipomoea spp.</i>
Mustard, blue	<i>Chorispora tenella</i>
Mustard, tansy	<i>Descurainia pinnata</i>
Mustard, tumble	<i>Sisymbrium altissimum</i>
Mustard, wild	<i>Sinapis arvensis</i>
Oats, wild	<i>Avena fatua</i>
Panicum	<i>Panicum spp.</i>
Pennycress, field	<i>Thlaspi arvense</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, smooth	<i>Amaranthus hybridus</i>
Ragweed, common	<i>Ambrosia artemisiifolia</i>
Ragweed, giant	<i>Ambrosia trifida</i>
Rocket, London	<i>Sisymbrium irio</i>
Rye	<i>Secale cereale</i>
Ryegrass, Italian <sup>††</sup>	<i>Lolium multiflorum</i>
Sandbur, field	<i>Cenchrus spp.</i>
Shattercane	<i>Sorghum bicolor</i>
Shepherd's-purse	<i>Capsella bursa-pastoris</i>
Signalgrass, broadleaf	<i>Brachiaria platyphylla</i>
Smartweed, Pennsylvania	<i>Polygonum pensylvanicum</i>

Common Name	Scientific Name		
Sowthistle, annual	<i>Sonchus oleraceus</i>	Cordgrass (7)	<i>Spartina spp.</i>
Spanishneedles †	<i>Bidens bipinnata</i>	Cutgrass, giant † (8)	<i>Zizaniopsis miliacea</i>
Stinkgrass	<i>Eragrostis ciliaris</i>	Dallisgrass (31)	<i>Paspalum dilatatum</i>
Sunflower	<i>Helianthus annuus</i>	Dandelion (31)	<i>Taraxacum officinale</i>
Thistle, Russian	<i>Salsola kali</i>	Dock, curly (31)	<i>Rumex crispus</i>
Spurry, umbrella	<i>Holosteum umbellatum</i>	Dogbane, hemp (9)	<i>Apocynum cannabinum</i>
Velvetleaf	<i>Abutilon theophrasti</i>	Fescue (31)	<i>Festuca spp.</i>
Wheat	<i>Triticum aestivum</i>	Fescue, tall (10)	<i>Festuca arundinacea</i>
Witchgrass	<i>Panicum capillare</i>	Guineagrass (11)	<i>Panicum maximum</i>

<sup>†</sup> Apply with hand-held equipment only.

\*\* Apply 3 pints of this product per acre.

Annual weeds will generally continue to germinate from seed throughout the growing season. Repeat treatments will be necessary to control later germinating weeds.

## Perennial Weeds

Apply this product to control most vigorously growing perennial weeds. Unless otherwise directed, apply when target plants are actively growing and most have reached early head or early bud stage of growth. Unless otherwise directed, allow at least 7 days after application before disturbing vegetation.

**NOTE:** If weeds have been mowed or tilled, do not treat until regrowth has reached the recommended stages. Fall treatments must be applied before a killing frost.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed.

**Specific Weed Control Recommendations:** For perennial weeds, apply the recommended rate plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient.. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information. .

**When applied as directed, this product plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient will control the following perennial weeds:** (Numbers in parentheses "( - )" following common name of a listed weed species refer to "Specific Perennial Weed Control Recommendations" for that weed which follow the species listing.)

Common Name	Scientific Name
Alfalfa (31)	<i>Medicago sativa</i>
Alligatorweed †(1)	<i>Alternanthera philoxeroides</i>
Anise/Fennel (31)	<i>Foeniculum vulgare</i>
Artichoke, Jerusalem (31)	<i>Helianthus tuberosus</i>
Bahiagrass (31)	<i>Paspalum notatum</i>
Bermudagrass (2)	<i>Cynodon dactylon</i>
Bindweed, field (3)	<i>Convolvulus arvensis</i>
Bluegrass, Kentucky (12)	<i>Poa pratensis</i>
Bluemeed, Texas (3)	<i>Helianthus ciliaris</i>
Brackenfern (4)	<i>Pteridium spp.</i>
Bromegrass, smooth (12)	<i>Bromus inermis</i>
Canarygrass, reed (12)	<i>Phalaris arundinacea</i>
Cattail (5)	<i>Typha spp.</i>
Clover, red (31)	<i>Trifolium pratense</i>
Clover, white (31)	<i>Trifolium repens</i>
Cogongrass (6)	<i>Imperata cylindrica</i>

Cordgrass (7)	<i>Spartina spp.</i>
Cutgrass, giant † (8)	<i>Zizaniopsis miliacea</i>
Dallisgrass (31)	<i>Paspalum dilatatum</i>
Dandelion (31)	<i>Taraxacum officinale</i>
Dock, curly (31)	<i>Rumex crispus</i>
Dogbane, hemp (9)	<i>Apocynum cannabinum</i>
Fescue (31)	<i>Festuca spp.</i>
Fescue, tall (10)	<i>Festuca arundinacea</i>
Guineagrass (11)	<i>Panicum maximum</i>
Hemlock, poison (31)	<i>Conium maculatum</i>
Horsenettle (31)	<i>Solanum carolinense</i>
Horseradish (9)	<i>Armoracia rusticana</i>
Ice Plant (22)	<i>Mesembryanthemum crystallinum</i>
Johnsongrass (12)	<i>Sorghum halepense</i>
Kikuyugrass (21)	<i>Pennisetum clandestinum</i>
Knapweed (9)	<i>Centaurea repens</i>
Lantana (13)	<i>Lantana camara</i>
Lespedeza, common (31)	<i>Lespedeza striata</i>
Lespedeza, sericea (31)	<i>Lespedeza cuneata</i>
Loosestrife, purple (14)	<i>Lythrum salicaria</i>
Lotus, American (15)	<i>Nelumbo lutea</i>
Maidencane (16)	<i>Panicum hematomon</i>
Milkweed (17)	<i>Asclepias spp.</i>
Muhly, wirestem (21)	<i>Muhlenbergia frondosa</i>
Mullein, common (31)	<i>Verbascum thapsus</i>
Napiergrass (31)	<i>Pennisetum purpureum</i>
Nightshade, silverleaf (3)	<i>Solanum elaeagnifolium</i>
Nutsedge, purple (18)	<i>Cyperus rotundus</i>
Nutsedge, yellow (18)	<i>Cyperus esculentus</i>
Orchardgrass (12)	<i>Dactylis glomerata</i>
Pampasgrass (19)	<i>Cortaderia jubata</i>
Paragrass (16)	<i>Bracharia mutica</i>
Phragmites <sup>††</sup> (20)	<i>Phragmites spp.</i>
Quackgrass (21)	<i>Agropyron repens</i>
Reed, giant (22)	<i>Arundo donax</i>
Ryegrass, perennial (12)	<i>Lolium perenne</i>
Smartweed, swamp (31)	<i>Polygonum coccineum</i>
Spatterdock (23)	<i>Nuphar luteum</i>
Starthistle, yellow (31)	<i>Centaurea solstitialis</i>
Sweet potato, wild †(24)	<i>Ipomoea pandurata</i>
Thistle, artichoke (25)	<i>Cynara cardunculus</i>
Thistle, Canada (25)	<i>Cirsium arvense</i>
Timothy (12)	<i>Phleum pratense</i>
Torpedograss †(26)	<i>Panicum repens</i>
Tules, common (27)	<i>Scirpus acutus</i>
Vaseygrass (31)	<i>Paspalum urvillei</i>
Velvetgrass (31)	<i>Holcus spp.</i>
Waterhyacinth (28)	<i>Eichornia crassipes</i>
Waterlettuce (29)	<i>Pistia stratiotes</i>
Waterprimrose (30)	<i>Ludwigia spp.</i>
Wheatgrass, western (12)	<i>Agropyron smithii</i>

<sup>†</sup> Partial control.

<sup>††</sup> Partial control in southeastern states. See "Specific Weed Control Recommendations" below.

## Specific Perennial Weed Control Recommendations:

1. **Alligatorweed:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 1/4 percent solution with hand-held equipment to provide partial control of alligatorweed. Apply when most of the target plants are in bloom. Repeat applications will be required to maintain such control.

2. **Bermudagrass:** Apply 7 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and when seedheads appear.
3. **Bindweed, field / Silverleaf Nightshade / Texas Blueweed:** Apply 6 to 7 1/2 pints of this product per acre as a broadcast spray west of the Mississippi River and 4 1/2 to 6 pints of this product per acre east of the Mississippi River. With hand-held equipment, use a 1 1/2 percent solution. Apply when target plants are actively growing and are at or beyond full bloom. For silverleaf nightshade, best results can be obtained when application is made after berries are formed. Do not treat when weeds are under drought stress. New leaf development indicates active growth. For best results apply in late summer or fall.
4. **Brackenfern:** Apply 4 1/2 to 6 pints of this product per acre as a broadcast spray or as a 3/4 to 1 percent solution with hand-held equipment. Apply to fully expanded fronds which are at least 18 inches long.
5. **Cattail:** Apply 4 1/2 to 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and are at or beyond the early-to-full bloom stage of growth. Best results are achieved when application is made during the summer or fall months.
6. **Cogongrass:** Apply 4 1/2 to 7 1/2 pints of this product per acre as a broadcast spray. Apply when cogongrass is at least 18 inches tall and actively growing in late summer or fall. Allow 7 or more days after application before tillage or mowing. Due to uneven stages of growth and the dense nature of vegetation preventing good spray coverage, repeat treatments may be necessary to maintain control.
7. **Cordgrass:** Apply 4 1/2 to 7 1/2 pints of this product per acre as a broadcast spray or as a 1 to 2 percent solution with hand-held equipment. Schedule applications in order to allow 6 hours before treated plants are covered by tidewater. The presence of debris and silt on the cordgrass plants will reduce performance. It may be necessary to wash targeted plants prior to application to improve uptake of this product into the plant.
8. **Cutgrass, giant:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment to provide partial control of giant cutgrass. Repeat applications will be required to maintain such control, especially where vegetation is partially submerged in water. Allow for substantial regrowth to the 7 to 10-leaf stage prior to retreatment.
9. **Dogbane, hemp / Knapweed / Horseradish:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth. For best results, apply in late summer or fall.
10. **Fescue, tall:** Apply 4 1/2 pints of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained.
11. **Guineagrass:** Apply 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and when most have reached at least the 7-leaf stage of growth.
12. **Johnsongrass / Bluegrass, Kentucky / Bromegrass, smooth / Canarygrass, reed / Orchardgrass / Ryegrass, perennial / Timothy / Wheatgrass, western:** Apply 3 to 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained. In the fall, apply before plants have turned brown.
13. **Lantana:** Apply this product as a 3/4 to 1 percent solution with hand-held equipment. Apply to actively growing lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth.
14. **Loosestrife, purple:** Apply 4 pints of this product per acre as a broadcast spray or as a 1 to 1 1/2 percent solution using hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost.
15. **Lotus, American:** Apply 4 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost. Repeat treatment may be necessary to control regrowth from underground parts and seeds.
16. **Maidencane / Paragrass:** Apply 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Repeat treatments will be required, especially to vegetation partially submerged in water. Under these conditions, allow for regrowth to the 7 to 10-leaf stage prior to retreatment.
17. **Milkweed, common:** Apply 4 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth.
18. **Nutsedge: purple, yellow:** Apply 4 1/2 pints of this product per acre as a broadcast spray, or as a 3/4 percent solution with hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Apply when target plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control.
19. **Pampasgrass:** Apply a 1 1/2 percent solution of this product with hand-held equipment when plants are actively growing.
20. **Phragmites:** For partial control of phragmites in Florida and the counties of other states bordering the Gulf of Mexico, apply 7 1/2 pints per acre as a broadcast spray or apply a 1 1/2 percent solution with hand-held equipment. In other areas of the U.S., apply 4 to 6 pints per acre as a broadcast spray or apply a 3/4 percent solution with hand-held equipment for partial control. For best results, treat during late summer or fall months when plants are actively growing and in full bloom. Due to the dense nature of the vegetation, which may prevent good spray coverage and uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop.
21. **Quackgrass / Kikuyugrass / Muhly, wirestem:** Apply 3 to 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment when most quackgrass or wirestem muhly is at least 8 inches in height (3 to 4-leaf stage of growth) and actively growing. Allow 3 or more days after application before tillage.
22. **Reed, giant / ice plant:** For control of giant reed and ice plant, apply a 1 1/2 percent solution of this product with hand-held equipment when plants are actively growing. For giant reed, best results are obtained when applications are made in late summer to fall.
23. **Spatterdock:** Apply 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when most plants are in full bloom. For best results, apply during the summer or fall months.

24. **Sweet potato, wild:** Apply this product as a 1 1/2 percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be required. Allow the plant to reach the recommended stage of growth before retreatment.
25. **Thistle, Canada / artichoke:** Apply 3 to 4 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment for Canada thistle. To control artichoke thistle, apply a 2 percent solution as a spray-to-wet application. Apply when target plants are actively growing and are at or beyond the bud stage of growth.
26. **Torpedograss:** Apply 6 to 7 1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1 1/2 percent solution with hand-held equipment to provide partial control of torpedograss. Use the lower rates under terrestrial conditions, and the higher rates under partially submerged or a floating mat condition. Repeat treatments will be required to maintain such control.
27. **Tules, common:** Apply this product as a 1 1/2 percent solution with hand-held equipment. Apply to actively growing plants at or beyond the seedhead stage of growth. After application, visual symptoms will be slow to appear and may not occur for 3 or more weeks.
28. **Waterhyacinth:** Apply 5 to 6 pints of this product per acre as a broadcast spray or apply a 3/4 to 1 percent solution with hand-held equipment. Apply when target plants are actively growing and at or beyond the early bloom stage of growth. After application, visual symptoms may require 3 or more weeks to appear with complete necrosis and decomposition usually occurring within 60 to 90 days. Use the higher rates when more rapid visual effects are desired.
29. **Waterlettuce:** For control, apply a 3/4 to 1 percent solution of this product with hand-held equipment to actively growing plants. Use higher rates where infestations are heavy. Best results are obtained from mid-summer through winter applications. Spring applications may require retreatment.
30. **Waterprimrose:** Apply this product as a 3/4 percent solution using hand-held equipment. Apply to plants that are actively growing at or beyond the bloom stage of growth, but before fall color changes occur. Thorough coverage is necessary for best control.
31. **Other perennial weeds listed above:** Apply 4 1/2 to 7 1/2 pints of per acre as a broadcast spray or apply as a 3/4 to 1 1/2 percent solution with hand-held equipment.

## Woody Brush and Trees

**NOTE:** If brush has been mowed or tilled or trees have been cut, do not treat until regrowth has reached the recommended stage of growth.

### Application Rates and Timing

When applied as a 5 to 8 percent solution as a directed application as described in the "Hand-Held and High-Volume Equipment" section, this product will control or partially control all wood brush and tree species listed in this section of this label. Use the higher rate of application for dense stands and larger woody brush and trees.

**Specific Brush or Tree Control Recommendations:** Numbers in parentheses "(-)" following the common name of a listed brush or tree species refer to "Specific Brush or Tree Control Recommendations" which follow the species listing. See this section for specific application rates and timing for listed species.

For woody brush and trees, apply the recommended rate plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information. Make applications when plants are actively growing and, unless otherwise directed, after full-leaf expansion. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of growth. Best results are obtained when application is made in late summer or fall after fruit formation.

In arid areas, best results are obtained when application is made in the spring or early summer when brush species are at high moisture content and are flowering. Ensure thorough coverage when using hand-held equipment. Symptoms may not appear prior to frost or senescence with fall treatments.

Allow 7 or more days after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

See the "Directions for Use" and "Mixing and Application Instructions" sections in this label for labeled use and specific application instructions. **When applied as directed, this product plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient will control the following woody brush plants and trees:** (Numbers in parentheses "(-)" following common name of a listed brush or tree species refer to "Specific Brush or Tree Control Recommendations" for that species which follow the species listing.)

Common Name	Scientific Name
Alder (1)	<i>Alnus spp.</i>
Ash †(20)	<i>Fraxinus spp.</i>
Aspen, quaking (2)	<i>Populus tremuloides</i>
Bearclover, Bearmat (20)	<i>Chamaebatia foliolosa</i>
Birch (3)	<i>Betula spp.</i>
Blackberry (1)	<i>Rubus spp.</i>
Broom, French (4)	<i>Cytisus monspessulanus</i>
Broom, Scotch (4)	<i>Cytisus scoparius</i>
Buckwheat, California †(5)	<i>Eriogonum fasciculatum</i>
Cascara †(20)	<i>Rhamnus purshiana</i>
Catsclaw †(6)	<i>Acacia greggi</i>
Ceanothus (20)	<i>Ceanothus spp.</i>
Chamise (17)	<i>Adenostoma fasciculatum</i>
Cherry, bitter (7)	<i>Prunus emarginata</i>
Cherry, black (7)	<i>Prunus serotina</i>
Cherry, pin (7)	<i>Prunus pensylvanica</i>
Coyote brush (8)	<i>Baccharis consanguinea</i>
Creeper, Virginia †(20)	<i>Parthenocissus quinquefolia</i>
Dewberry (1)	<i>Rubus trivialis</i>
Dogwood (9)	<i>Cornus spp.</i>
Elderberry (3)	<i>Sambucus spp.</i>
Elm †(20)	<i>Ulmus spp.</i>
Eucalyptus, bluegum (10)	<i>Eucalyptus globulus</i>
Hasardia †(5)	<i>Haplopappus squamosus</i>
Hawthorn (2)	<i>Crataegus spp.</i>
Hazel (3)	<i>Corylus spp.</i>
Hickory (9)	<i>Carya spp.</i>
Holly, Florida (11)	<i>Schinus terebinthifolius</i>
(Brazilian peppertree)	

Common Name	Scientific Name
Honeysuckle (1)	<i>Lonicera spp.</i>
Hornbeam, American (20)	<i>Carpinus caroliniana</i>
Kudzu (12)	<i>Pueraria lobata</i>
Locust, black <sup>†</sup> (20)	<i>Robinia pseudoacacia</i>
Manzanita (20)	<i>Arctostaphylos spp.</i>
Maple, red <sup>†</sup> (13)	<i>Acer rubrum</i>
Maple, sugar (14)	<i>Acer saccharum</i>
Maple, vine <sup>†</sup> (20)	<i>Acer circinatum</i>
Monkey flower <sup>†</sup> (5)	<i>Mimulus guttatus</i>
Oak, black <sup>†</sup> (20)	<i>Quercus velutina</i>
Oak, northern pin (14)	<i>Quercus palustris</i>
Oak, post (1)	<i>Quercus stellata</i>
Oak, red (14)	<i>Quercus rubra</i>
Oak, southern red (7)	<i>Quercus falcata</i>
Oak, white <sup>†</sup> (20)	<i>Quercus alba</i>
Persimmon <sup>†</sup> (20)	<i>Diospyros spp.</i>
Poison-ivy (15)	<i>Rhus radicans</i>
Poison-oak (15)	<i>Rhus toxicodendron</i>
Poplar, yellow <sup>†</sup> (20)	<i>Liriodendron tulipifera</i>
Prunus (7)	<i>Prunus spp.</i>
Raspberry (1)	<i>Rubus spp.</i>
Redbud, eastern (20)	<i>Cercis canadensis</i>
Rose, multiflora (16)	<i>Rosa multiflora</i>
Russian-olive (20)	<i>Elaeagnus angustifolia</i>
Sage: black (17), white	<i>Salvia spp.</i>
Sagebrush, California (17)	<i>Artemisia californica</i>
Salmonberry (3)	<i>Rubus spectabilis</i>
Salt cedar <sup>†</sup> (9)	<i>Tamarix spp.</i>
Saltbush, sea myrtle (18)	<i>Baccharis halimifolia</i>
Sassafras (20)	<i>Sassafras albidum</i>
Sourwood <sup>†</sup> (20)	<i>Oxydendrum arboreum</i>
Sumac, poison <sup>†</sup> (20)	<i>Rhus vernix</i>
Sumac, smooth <sup>†</sup> (20)	<i>Rhus glabra</i>
Sumac, winged <sup>†</sup> (20)	<i>Rhus copallina</i>
Sweetgum (7)	<i>Liquidambar styraciflua</i>
Swordfern <sup>†</sup> (20)	<i>Polystichum munitum</i>
Tallowtree, Chinese (17)	<i>Sapium sebiferum</i>
Thimbleberry (3)	<i>Rubus parviflorus</i>
Tobacco, tree <sup>†</sup> (5)	<i>Nicotiana glauca</i>
Trumpet creeper (2)	<i>Campsis radicans</i>
Waxmyrtle, southern <sup>†</sup> (11)	<i>Myrica cerifera</i>
Willow (19)	<i>Salix spp.</i>

<sup>†</sup>Partial control (See below for control or partial control instructions.)

#### Specific Brush or Tree Control Recommendations:

- Alder / Blackberry / Dewberry / Honeysuckle / Oak, Post / Raspberry:** For control, apply 4 1/2 to 6 pints per acre as a broadcast spray or as a 3/4 to 1 1/4 percent solution with hand-held equipment.
- Aspen, Quaking / Hawthorn / Trumpet creeper:** For control, apply 3 to 4 1/4 pints of this product per acre as a broadcast spray or as a 3/4 to 1 1/4 percent solution with hand-held equipment.
- Birch / Elderberry / Hazel / Salmonberry / Thimbleberry:** For control, apply 3 pints per acre of this product as a broadcast spray or as a 3/4 percent solution with hand-held equipment.
- Broom, French / Broom, Scotch:** For control, apply a 1 1/4 to 1 1/2 percent solution with hand-held equipment.
- Buckwheat, California / Hasardia / Monkey flower / Tobacco, tree:** For partial control of these species, apply a 3/4 to 1 1/2 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

- Catsclaw:** For partial control, apply a 1 1/4 to 1 1/2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.
- Cherry, bitter / Cherry, black / Cherry, pin / Oak, southern red / Sweetgum / Prunus:** For control, apply 3 to 7 1/2 pints of this product per acre as a broadcast spray or as a 1 to 1 1/2 percent solution with hand-held equipment.
- Coyote brush:** For control, apply a 1 1/4 to 1 1/2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.
- Dogwood / Hickory / Salt cedar:** For partial control, apply a 1 to 2 percent solution of this product with hand-held equipment or 6 to 7 1/2 pints per acre as a broadcast spray.
- Eucalyptus, bluegum:** For control of eucalyptus resprouts, apply a 1 1/2 percent solution of this product with hand-held equipment when resprouts are 6 to 12-feet tall. Ensure complete coverage. Apply when plants are actively growing. Avoid application to drought-stressed plants.
- Holly, Florida / Waxmyrtle, southern:** For partial control, apply this product as a 1 1/2 percent solution with hand-held equipment.
- Kudzu:** For control, apply 6 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Repeat applications will be required to maintain control.
- Maple, red:** For control, apply as a 3/4 to 1 1/4 percent solution with hand-held equipment when leaves are fully developed. For partial control, apply 2 to 7 1/2 pints of this product per acre as a broadcast spray.
- Maple, sugar / Oak: northern pin / Oak, red:** For control, apply as a 3/4 to 1 1/4 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.
- Poison-ivy / Poison-oak:** For control, apply 6 to 7 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.
- Rose, multiflora:** For control, apply 3 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.
- Sage, black / Sagebrush, California / Chamise / Tallowtree, Chinese:** For control of these species, apply a 3/4 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.
- Saltbush, sea myrtle:** For control, apply this product as a 1 percent solution with hand-held equipment.
- Willow:** For control, apply 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment.
- Other woody brush and trees listed above:** For partial control, apply 3 to 7 1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1 1/2 percent solution with hand-held equipment.

#### Aquatic and other Noncrop Sites

Apply this product as directed and under conditions described to control or partially control weeds and woody plants listed in the "Weeds Controlled" section in industrial, recreational and public areas or other similar aquatic or terrestrial sites on this label.

## Noncrop Sites

This product may be used to control the listed weeds in and around aquatic sites and on noncrop sites such as:

Airports  
Golf Courses  
Habitat Restoration & Management Areas  
Highways & Roadsides  
Industrial Plant Sites  
Lumberyards  
Parking Areas  
Parks  
Petroleum Tank Farms  
Pipeline, Power, Telephone & Utility Rights-of-Way  
Pumping Installations  
Railroads  
Schools  
Storage Areas  
Similar Sites

## Aquatic Sites

This product may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas and similar sites.

If aquatic sites are present in the noncrop area and are part of the intended treatment, read and observe the following directions:

- This product does not control plants which are completely submerged or have a majority of their foliage under water.
- There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.
- Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.
- **NOTE:** Do not apply this product directly to water within 1/2 mile up-stream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made only in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.
- For treatments after drawdown of water or in dry ditches, allow 7 or more days after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after drawdown to ensure application to actively growing weeds.

- Floating mats of vegetation may require retreatment. Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not re-treat within 24 hours following the initial treatment.

- Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7 1/2 pints per acre must not be exceeded in any single broadcast application that is being made over water.
- When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

## Forestry Sites and Utility Rights-of-Way

In forest and utility sites, this product is recommended for the control or partial control of woody brush, trees, and annual and perennial herbaceous weeds. This product is also recommended for use in preparing or establishing wildlife openings within these sites, in pine straw plantations for maintaining logging roads, and for side trimming along utility rights-of-way.

In forestry sites, this product is recommended for use in site preparation prior to planting any tree species, including Christmas trees and silvicultural nursery sites.

In utility sites, this product is recommended for use along electrical power, pipeline, and telephone rights-of-way, and in other utility sites associated with these rights-of-way, such as substations.

### Application Rates <sup>t</sup>:

Method of Application	Application Rate	Spray Volume (gal/acre)
<b>Broadcast</b>		
Aerial	1.5 to 7.5 qt/acre	5 to 30
Ground	1.5 to 7.5 qt/acre	10 to 60
<b>Spray-to-Wet</b>		
Handgun, Backpack Mistblower	0.75 to 2% by volume	spray-to-wet
<b>Low Volume Directed Spray <sup>tt</sup></b>		
Handgun, Backpack Mistblower	5% to 10% by volume	partial coverage

<sup>t</sup>Where repeat applications are necessary, do not exceed 8.0 quarts per acre per year.

<sup>tt</sup>For low volume directed spray applications, coverage should be uniform with at least 50 percent of the foliage contacted. For best results, coverage of the top one-half of the plant is important.

In forestry site preparation and utility rights-of-way applications, this product requires use with a surfactant such as a non-ionic surfactant containing greater than 80 percent active ingredient. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

Use higher rates of this product within the recommended rate ranges for control or partial control of woody brush, trees and hard-to-control perennial herbaceous weeds. For best results, apply to actively growing woody brush and trees after full leaf expansion and before fall color and leaf drop. Use increased rates within the recommended rate range to control of perennial herbaceous weeds from emergence up to the appearance of seedheads, flowers or berries appear. Use lower rates within the recommended rate range to control annual herbaceous weeds and actively growing perennial herbaceous weeds after seedheads, flowers or berries appear. Apply to foliage of actively growing annual herbaceous weeds anytime after emergence.

## Tank Mixtures

This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled. When tank mixing, read and observe applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product on the mixture. Any recommended rate of this product may be used in a tank mix.

**Note:** For forestry site preparation, make sure the tank mix product is approved for use prior to planting the desired species. Observe planting interval restrictions. For side trimming treatments in utility rights-of-way, tank mixtures with Arsenal 2WSL herbicide are not recommended. For side trimming treatments, it is recommended that this product be used alone as recommended, or as a tank mix with Garlon.

Product	Broadcast Rate	Use Sites
Arsenal Applicators Concentrate	2 to 16 fl oz/acre	Forestry site preparation
Oust	1 to 4 oz/acre	Forestry site preparation, utility sites
Garlon 3A <sup>†</sup>	1 to 4 qt/acre	Forestry site preparation, utility sites
Garlon 4	1 to 4 qt/acre	Forestry site preparation, utility sites
Arsenal 2WSL	2 to 32 fl oz/acre	Utility sites
	<b>Spray-to-Wet Rates</b>	
Arsenal Applicators Concentrate	1/32% to 1/2% by volume	Forestry site preparation
Arsenal 2WSL	1/32% to 1/2% by volume	Utility sites
	<b>Low Volume Directed Spray Rates</b>	
Arsenal Applicators Concentrate	1/8% to 1/2% by volume	Forestry site preparation
Arsenal 2WSL	1/8% to 1/2% by volume	Utility sites

<sup>†</sup> Ensure that Garlon 3A is thoroughly mixed with water before adding this product. Agitation is required while mixing this product with Garlon 3A to avoid compatibility problems.

For control of herbaceous weeds, use the lower recommended tank mixture rates. For control of dense stands or difficult-to-control woody brush and trees, use the higher recommended rates.

## Forestry Conifer and Hardwood Release

### Directed Sprays and Selective Equipment

This product may be applied as a directed spray or by using selective equipment in forestry conifer and hardwood sites, including Christmas tree plantations and silvicultural nurseries. This product requires use with a surfactant. Use only surfactants that are approved for conifer release and specified on the surfactant label as safe for use in conifer release (pine release). Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

**Tank Mixing:** In hardwood plantations, tank mixtures with Oust may be used. In pine plantations, tank mixtures with Garlon 4 or Arsenal AC may be used. Comply with all site restrictions, forestry species limitations, and precautions on the tank mix product labels.

Avoid contact of spray drift, mist or drips with foliage, green bark or non-woody surface roots of desirable plant species. See "Application Equipment and Techniques" section of this label for specific recommendations and precautions.

**Spray-to-Wet Applications:** Use a 2 percent spray solution to control undesirable woody brush and trees. To control herbaceous weeds, use a 1 to 2 percent spray solution.

**Low Volume Directed Spray Applications:** Use a 5 to 10 percent spray solution. Coverage should be uniform with at least 50 percent of the foliage contacted. Coverage of the top one-half of the unwanted vegetation is important.

**Broadcast Applications:** For equipment calibrated for broadcast applications, use 1 1/2 to 7 1/2 quarts of this product per acre. Apply in 10 to 60 gallons of clean water per acre. Shielded application equipment may be used to avoid contact of the spray solution with desirable plants. Shields should be adjusted to prevent spray contact with the foliage of green bark of desirable vegetation.

**Wiper Application Equipment:** See the "Selective Equipment" section of this label for equipment and application rate recommendations.

### Broadcast Application

**Note:** Except where specifically recommended below, make broadcast applications of this product only where conifers have been established for more than one year.

**Broadcast application must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring.**

Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied. Damage can be accentuated if applications are made when conifers are actively growing, or are under stress from drought, flood water, improper planting, insects, animal damage or diseases.

Accord Concentrate requires use with a surfactant. Use a surfactant that is labeled/recommended for use in over-the-top release applications. Use of this product without a surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

**For release of the following conifer species outside the Southeastern United States:**

Douglas fir (*Pseudotsuga menziesii*)  
Fir (*Abies* species)  
Hemlock <sup>†</sup> (*Tsuga* species)  
Pines <sup>†</sup> (*Pinus* species)  
Redwood, California <sup>††</sup> (*Sequoia* species)

<sup>†</sup>Includes all species except loblolly pine, longleaf pine, shortleaf pine or slash pine.

<sup>††</sup> Use of a surfactant is not recommended for release of hemlock species or California redwood. In mixed conifer stands, injury to these species may result if a surfactant is used.

**Application Rate for Conifer Release:** Apply 3/4 to 1 1/2 quarts per acre as a broadcast spray. In Maine and New Hampshire, up to 2 1/4 quarts per acre of this product may be used for the control and suppression of difficult-to-control hardwood species.

To release Douglas fir, and pine and spruce species at the end of the first growing season (except in California), apply 3/4 to 1 1/8 quarts per acre of this product. Make sure that all conifers are well hardened off.

**Note:** For release of Douglas fir with this product or recommended tank mixtures, a nonionic surfactant recommended for over-the-top foliar spray may be used. To avoid possible conifer injury, nonionic surfactants may be used at 2 fluid ounces per acre at elevations above 1500 feet, or 1 fluid ounce per acre in the coastal range or at elevations below 1500 feet. Use of surfactant rates exceeding those listed above may result in unacceptable conifer injury and are not recommended. Make sure that the nonionic surfactant has been adequately tested for safety to Douglas fir before use.

**Tank Mixtures with Oust:** To release jack pine, white pine and white spruce, apply 3/4 to 1 1/2 quarts of this product with 1 to 3 ounces (1 to 1 1/2 ounces for white pine) of Oust per acre. Make applications to actively growing weeds as a broadcast spray over the top of established conifers. Applications at these rates should be made after formation of conifer resting buds in the late summer or fall.

**Tank Mixtures with Arsenal Applicators Concentrate:** This product may be tank mixed with Arsenal Applicators Concentrate for release of Douglas fir. Tank mix 3/4 to 1 1/8 quarts of this product with 2 to 6 fluid ounces of Arsenal Applicators Concentrate per acre. For release of balsam fir and red spruce, apply a mixture of 1 1/2 quarts of this product with 1 to 2 1/2 fluid ounces of Arsenal Applicators Concentrate per acre.

In Maine and New Hampshire for the release of red pine, balsam fir, red spruce, white spruce, Norway spruce, and black spruce with dense tough-to-control brush and where maples make up a large component of the undesirable trees, up to 2 1/4 quarts per acre of this product may be tank mixed with 1 to 2 1/2 fluid ounces per acre of Arsenal Applicators Concentrate herbicide and applied as a broadcast spray.

**Tank mixtures with Arsenal Applicators Concentrate and Oust or Oust XP Herbicides:** In Maine and New Hampshire for release of red pine, balsam fir, red spruce, white spruce, Norway spruce and black spruce with heavy grass and herbaceous weed densities, tough-to-control brush and where maples make up a large component of the undesirable trees up to 2 1/4 quarts per acre of this product may be tank mixed with 1 to 2.5 fluid ounces per acre of Arsenal Applicators Concentrate and 1 to 3 oz of Oust or Oust XP herbicides and applied as a broadcast spray.

**For release of the following conifer species in the Southeastern United States:**

Loblolly pine (*Pinus taeda*)  
Eastern white pine (*Pinus strobus*)  
Shortleaf pine (*Pinus echinata*)  
Slash pine (*Pinus elliottii*)  
Virginia pine (*Pinus virginiana*)  
Longleaf pine (*Pinus palustris*)

Apply 1 1/8 to 1 7/8 quarts of this product per acre as a broadcast spray during late summer or early fall after the conifers have hardened off. For applications at the end of the first growing season, use 3/4 quart of this product alone or in a recommended tank mixture.

**Tank Mixtures with Arsenal Applicators Concentrate:** For conifer release, apply 3/4 to 1 1/2 quarts of this product with 2 to 16 fluid ounces of Arsenal Applicators Concentrate per acre as a broadcast spray. Use only on conifer species that are labeled for over-the-top spray for both products. Use the higher recommended rates for dense tough-to-control wood brush and trees.

Read and observe label claims, cautionary statements and all information on the labels of each product used in these tank mixtures. Use according to the most restrictive precautionary statements for each product in the mixture.

### **Herbaceous Release**

When applied as directed, this product plus listed residual herbicides provides postemergence control of the annual weeds and control or suppression of the perennial weeds listed in this label, and residual control of the weeds listed in the residual herbicide label. Make applications to actively growing weeds as a broadcast spray over the top of labeled conifers.

**Tank Mixtures with Oust:** To release loblolly pines, tank mix 12 to 18 fluid ounces of this product with 2 to 4 ounces of Oust per acre.

To release slash pines, tank mix 9 to 12 fluid ounces of this product with 2 to 4 ounces of Oust per acre.

In Maine and New Hampshire for release of red pine, balsam fir, red spruce, white spruce, Norway spruce, and black spruce with heavy grass and herbaceous weeds infesting the site, up to 2 1/4 quarts per acre of may be tank mixed with 1 to 3 oz of Oust herbicide or Oust XP herbicide to control grass, herbaceous weeds and woody brush, and applied as a broadcast spray.

For tank mixtures with Oust use a surfactant that is labeled/recommended for use in over-the-top herbaceous release applications. Use of this product without a surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

Weed control may be reduced if water volumes exceed 25 gallons per acre for these treatments.

**Tank Mixture with Atrazine:** To release Douglas fir, apply 3/4 quart of this product with 4 pounds a.i. of atrazine per acre. Apply only over Douglas fir that has been established for at least one full growing season. Apply in the early spring, usually mid-March through early April. Injury will occur if applications are made after bud swell in the spring. For this use, do not add surfactant to the tank mixture.

Always read and follow the manufacturer's label for all herbicides and surfactants used.

### **Wetland Sites**

This product may be used in and around water (aquatic areas) and wetlands found in forestry and in power, telephone and pipeline rights-of-way sites, including where these sites are adjacent to or surrounding domestic water supply reservoirs, supply streams, lakes and ponds. Read and observe the following before making applications in and around water.

Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat in such areas.

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

**Note:** Do not apply this product directly to water within 1/2 mile up-stream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as a lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after application. These aquatic applications may be made ONLY in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the application. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.

Do not spray open bodies of water where woody brush, trees and herbaceous weeds do not exist. The maximum application rate of 3 3/4 quarts per acre must not be exceeded in a single over-water broadcast application except as follows, where any recommended rate may be applied:

- Stream crossings in utility right-of-way.
- Where applications will result in less than 20 percent of the total water area being treated.

### **Wildlife Habitat Restoration and Management Areas**

This product is recommended for the restoration and/or maintenance of native habitat and in wildlife management areas.

**Habitat Restoration and Maintenance:** When applied as directed, exotic and other undesirable vegetation may be controlled in habitat management areas. Applications may be made to allow recovery of native plant species, to open up water to attract waterfowl, and for similar broad-spectrum vegetation control requirements in habitat management areas. Spot treatments may be made to selectively remove unwanted plants for habitat enhancement. For spot treatments, care should be exercised to keep spray off of desirable plants.

**Wildlife Food Plots:** This product may be used as a site preparation treatment prior to planting wildlife food plots. Apply as directed to control vegetation in the plot area. Any wildlife food species may be planted after applying this product, or native species may be allowed to reinfest the area. If tillage is needed to prepare a seedbed, wait 7 days after applying this product before tilling to allow for maximum effectiveness.

### **Wiper Applications**

For wick or wiper applications, mix 1 gallon of this product with 2 gallons of clean water to make a 33 percent solution. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

Wiper applications can be used to control or suppress annual and perennial weeds listed on this label. In heavy weed stands, a double application in opposite directions may improve results. See the "Weed Controlled" section in this label for recommended timing, growth stage and other instructions for achieving optimum results

### **Cut Stump Application**

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. **Apply a 50 to 100 percent solution of this product to freshly cut surface immediately after cutting.** Delay in applying this product may result in reduced performance. For best results, trees should be cut during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will control, partially control or suppress most woody brush and tree species, some of which are listed below:

Common Name	Scientific Name
Alder	<i>Alnus spp.</i>
Coyote brush †	<i>Baccharis consanguinea</i>
Dogwood †	<i>Cornus spp.</i>
Eucalyptus	<i>Eucalyptus spp.</i>
Hickory †	<i>Carya spp.</i>
Madrone	<i>Arbutus menziesii</i>
Maple †	<i>Acer spp.</i>
Oak	<i>Quercus spp.</i>
Poplar †	<i>Populus spp.</i>
Reed, giant	<i>Arundo donax</i>

Common Name	Scientific Name
Salt cedar	<i>Tamarix spp.</i>
Sweet gum †	<i>Liquidambar styraciflua</i>
Sycamore †	<i>Platanus occidentalis</i>
Tan oak	<i>Lithocarpus densiflorus</i>
Willow	<i>Salix spp.</i>

† This product is not approved for this use on these species in the state of California.

### Injection and Frill Applications

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment which must penetrate into living tissue. Apply the equivalent of 1 ml of this product per 2 to 3 inches of trunk diameter. This is best achieved by applying 25 to 100 percent concentration of this product either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying dilute material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In species such as these, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, applications should be made during periods of active growth and full leaf expansion.

This treatment will control the following woody species:

Common Name	Scientific Name
Oak	<i>Quercus spp.</i>
Poplar	<i>Populus spp.</i>
Sweet gum	<i>Liquidambar styraciflua</i>
Sycamore	<i>Platanus occidentalis</i>

This treatment will suppress the following woody species:

Common Name	Scientific Name
Black gum †	<i>Nyssa sylvatica</i>
Dogwood	<i>Cornus spp.</i>
Hickory	<i>Carya spp.</i>
Maple, red	<i>Acer rubrum</i>

† This product is not approved for this use on this species in the state of California.

### Release of Bermudagrass or Bahiagrass on Noncrop Sites

#### Release Of Dormant Bermudagrass And Bahiagrass

When applied as directed, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass or bahiagrass. Make applications to dormant bermudagrass or bahiagrass.

For best results on winter annuals, treat when weeds are in an early growth stage (below 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is in or beyond the 4 to 6-leaf stage.

### Weeds Controlled

Rate recommendations for control or suppression of winter annuals and tall fescue are listed below.

Apply the recommended rates of this product in 10 to 25 gallons of water per acre plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

### Weeds Controlled or Suppressed †

Note: C = Controlled; S = Suppressed

Weed Species	Rate (Fluid Ounces Per Acre)					
	6	9	12	18	24	48
Barley, little <i>Hordeum pusillum</i>	S	C	C	C	C	C
Bedstraw, catchweed <i>Galium aparine</i>	S	C	C	C	C	C
Bluegrass, annual <i>Poa annua</i>	S	C	C	C	C	C
Chervil <i>Chaerophyllum tainturieri</i>	S	C	C	C	C	C
Chickweed, common <i>Stellaria media</i>	S	C	C	C	C	
Clover, crimson <i>Trifolium incarnatum</i>	•	S	S	C	C	C
Clover, large hop <i>Trifolium campestre</i>	•	S	S	C	C	C
Speedwell, corn <i>Veronica arvensis</i>	S	C	C	C	C	C
Fescue, tall <i>Festuca arundinacea</i>	•	•	•	•	S	S
Geranium, Carolina <i>Geranium carolinianum</i>	•	•	S	S	C	C
Henbit <i>Lamium amplexicaule</i>	•	S	C	C	C	C
Ryegrass, Italian <i>Lolium multiflorum</i>	•	•	S	C	C	C
Vetch, common <i>Vicia sativa</i>	•	•	S	C	C	C

† These rates apply only to sites where an established competitive turf is present.

### Release Of Actively Growing Bermudagrass

NOTE: Use only on sites where bahiagrass or bermudagrass are desired for ground cover and some temporary injury or yellowing of the grasses can be tolerated.

When applied as directed, this product will aid in the release of bermudagrass by providing control of annual species listed in the "Weeds Controlled" section in this label, and suppression or partial control of certain perennial weeds.

For control or suppression of those annual species listed in this label, use 3/4 to 2 1/4 pints of this product as a broadcast spray in 10 to 25 gallons of spray solution per acre, plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information. Use the lower rate when treating annual weeds below 6 inches in height (or length of runner in annual vines). Use the higher rate as size of plants increases or as they approach flower or seedhead formation.

Use the higher rate for partial control or longer-term suppression of the following perennial species. Use lower rates for shorter-term suppression of growth.

Bahiagrass	Johnsongrass <sup>†</sup>
Dallisgrass	Trumpetcreeper <sup>**</sup>
Fescue (tall)	Vaseygrass

<sup>†</sup> Johnsongrass is controlled at the higher rate.

<sup>\*\*</sup> Suppression at the higher rate only.

Use only on well-established bermudagrass. Bermudagrass injury may result from the treatment but regrowth will occur under moist conditions. Repeat applications in the same season are not recommended, since severe injury may result.

### **Bahiagrass Seedhead and Vegetative Suppression**

When applied as directed in the "Noncrop Sites" section in this label, this product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with single applications and approximately 120 days with sequential applications.

Apply this product 1 to 2 weeks after full green-up of bahiagrass or after the bahiagrass has been mowed to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 5 fluid ounces per acre of this product in 10 to 25 gallons of water per acre, plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information.

Sequential applications of this product plus nonionic surfactant may be made at approximately 45-day intervals to extend the period of seedhead and vegetative growth suppression. For continued vegetative growth suppression, sequential applications must be made prior to seedhead emergence.

Apply no more than 2 sequential applications per year. As a first sequential application, apply 3 fluid ounces of this product per acre plus nonionic surfactant. A second sequential application of 2 to 3 fluid ounces per acre plus nonionic surfactant may be made approximately 45 days after the last application.

### **Annual Grass Growth Suppression**

For growth suppression of some annual grasses, such as annual ryegrass, wild barley and wild oats growing in coarse turf on roadsides or other industrial areas, apply 3 to 4 ounces of this product in 10 to 40 gallons of water per acre plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient.. Use of this product without surfactant will result in reduced herbicide performance. Refer to the "Mixing and Application Instructions" section of this label and the surfactant manufacturer label for more information. Applications should be made when annual grasses are actively growing and before the seedheads are in the boot stage of development. Treatments made after seedhead emergence may cause injury to the desired grasses.

### **Terms and Conditions of Use**

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitations of Remedies.

### **Warranty Disclaimer**

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

### **Inherent Risks of Use**

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. To the fullest extent permitted by law, all such risks shall be assumed by buyer.

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**Limitation of Remedies**

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

- (1) Refund of purchase price paid by buyer or user for product bought, or
- (2) Replacement of amount of product used.

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. To the fullest extent permitted by law, in no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

\*Trademark of Dow AgroSciences LLC  
Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.

Label Code: D02-148-004

Replaces Label: D02-148-003

LOES Number: 010-01471

EPA-accepted 07/13/06

**Revisions:**

1. Revised marketing claims to remove pine plantations and add grazed areas on these sites
2. Added/revised surfactant instructions
3. Revised nonionic surfactant instructions to 80% active ingredient
4. Revised use site text under Aquatic and other Noncrop Sites



## MATERIAL SAFETY DATA SHEET

**Univar USA Inc.**  
9430 Research Boulevard  
Suite 350, Echelon Bldg. IV  
Austin, Texas 78759

**Emergency Response Telephone Numbers**  
For Spills Call: 1-(800)-424-9300  
For Medical Emergencies Call: 1-(866)-674-4334  
For Other Emergencies Call: 1-(952)-653-3523

### I. Material Identification

Product Name: **MasterLine Kontrol 4 – 4 for Mosquitoes, Flies & Gnats**  
EPA Reg. No: 73748-4

#### INGREDIENTS: (% w/w)

Permethrin (CAS Reg. No. 52645-53-1) (3-phenoxyphenyl) methyl ( $\pm$ ) cis, trans-3-(2,2-dichloroethyl)- -2,2-dimethylcyclopropane carboxylate <sup>1</sup>	4.6%
Piperonyl Butoxide (CAS Reg. No. 51-03-6) Equivalent to 80% (butylcarbityl)(6-propylpiperonyl) ether And 20% related compounds	4.6%
Inert Ingredients <sup>2</sup>	90.8%

<sup>1</sup> *cis/trans* ratio: minimum 35% ( $\pm$ ) *cis* and maximum 65% *trans*

<sup>2</sup> Petroleum distillate solvent (CAS No. 64741-89-5).

Chemical Class: Synthetic Pyrethroid Insecticide and Synergist

EPA Signal Word: Caution

### II. Hazardous Ingredients

<u>MATERIAL:</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Active Ingredients: Permethrin Piperonyl Butoxide	Not established Not established	Not established Not established
Inert Ingredient: Petroleum Distillate	5 mg/m <sup>3</sup> (oil mist)	5 mg/m <sup>3</sup> (oil mist)



### III. Health Hazard Data

**EYE:** May cause eye irritation, but does not cause irreversible damage to eye tissue.

**SKIN CONTACT:** May cause moderate skin irritation with prolonged or repeated contact. In rare instances, exposure to this product may cause numbing, burning and tingling sensations. These effects are reversible and usually subside within 12 hours.

**SKIN ABSORPTION:** The acute dermal toxicity is considered to be low. The dermal LD<sub>50</sub> for rabbits is greater than 2000 mg/kg.

**INGESTION:** The acute oral toxicity is considered to be low. The oral LD<sub>50</sub> for rats is greater than 1000 mg/kg. Small amounts that might be swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause serious injury, even death. If aspirated (liquid enters the lungs), may cause lung damage or even death due to chemical pneumonia.

**INHALATION:** The acute inhalation toxicity is considered to be low. The inhalation LC<sub>50</sub> for rats is greater than 4 mg/l for 4 hours. Symptoms of excessive exposure includes squinting eyes, irregular and rattled breathing, ataxia, headache, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects.

**SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:** Excessive exposure may produce effects on the nervous system such as sensitivity to touch and sound, tremors, abnormal movement, and clonic convulsions. Long-term studies with permethrin in laboratory animal resulted in increased liver and kidney weights, induction of the liver microsomal drug metabolizing enzyme system, and histopathological changes in the lungs and liver. Long-term studies with piperonyl butoxide indicated increased organ weights in the liver, kidney, and adrenal glands.

**CANCER INFORMATION:** Chronic feeding studies with permethrin in mice and rats indicate limited evidence of oncogenicity in laboratory animals. Based on comprehensive evaluations of all relevant health effects data, it was concluded that the oncogenic potential in humans is extremely weak or nonexistent. A chronic feeding study in mice indicate an increased incidence of benign liver tumors; the significance of these findings is questionable and under review. The doses that produced this oncogenic effect in laboratory animals, greatly exceeds human exposure levels for the recommended use of this product.

**TERATOLOGY (BIRTH DEFECTS):** The active ingredients in this product did not cause birth defects in laboratory animal studies. Exposures having no effect on the mothers had no effect on the fetuses in rabbits and rats. The no-effect levels for permethrin in rabbits and rats were 600 mg/kg and 50 mg/kg, respectively. The no-effect levels for piperonyl butoxide in rabbits and rats were 200 mg/kg and 1000 mg/kg, respectively.



**REPRODUCTIVE EFFECTS:** Permethrin and piperonyl butoxide did not interfere with fertility in animal reproduction studies. The no effect level for permethrin in a two-generation rat reproduction study was 180 mg/kg. The no-effect level for piperonyl butoxide in a two-generation rat reproduction study was 350 mg/kg.

**MUTAGENICITY (EFFECTS ON GENETIC MATERIAL):** Based on a number of *in vivo* and *in vitro* studies, it was concluded that the active ingredients in this product are not mutagenic.

#### IV. First Aid Procedures

**EYES:** Hold eye open and rinse slowly and gently with water for 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

**SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.

**INGESTION:** Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

**INHALATION:** Remove person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further advice.

**NOTE TO PHYSICIAN:** This product has low oral, dermal, and inhalation toxicity. It is moderately irritating to the skin and is may be irritating to the eyes. Reversible skin sensations (paresthesia) may occur and skin salves have been found useful in reducing discomfort. Contains a petroleum distillate solvent that can produce a severe pneumonitis or fatal pulmonary edema if aspirated during vomiting. Consideration should be given to gastric lavage with an endotracheal tube in place. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

#### V. Physical Hazard Information

##### CHEMICAL & PHYSICAL PROPERTIES:

Color:	Light yellow
Physical State:	Liquid
Odor:	Slight odor of petroleum oil
Density:	7.27 lbs/gal (0.87 gm/cm <sup>3</sup> )
Solubility:	Does not disperse in water



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Viscosity: 60 cps  
pH: Not applicable - does not disperse with water  
Stability: Stable

### **FIRE AND EXPLOSION HAZARDS:**

Flash Point: > 200° F (93° C)  
Method Used: TCC  
Extinguishing Media: Foam, CO<sub>2</sub>, or dry chemical is preferred. Soft stream water fog only if necessary  
Fire & Explosion Precautions: Foam fire-extinguishing system is preferred because uncontrolled water can spread possible contamination. Do not allow fire-fighting water to escape into waterways or sewers. Toxic irritating gases can be formed.  
Fire-Fighting Equipment: Use positive-pressure self-contained breathing apparatus and full protective equipment.

### **REACTIVITY:**

Stability: (CONDITIONS TO AVOID) Avoid heating above 200° F (93° C). Contains a petroleum distillate solvent which can burn.  
Incompatibility: (SPECIFIC MATERIALS TO AVOID) Strong Oxidizers.  
Hazardous Decomposition: Under fire conditions hydrogen chloride, oxides of chlorine, carbon dioxide, carbon monoxide, and asphyxiants can be formed.  
Hazardous Polymerization: Will not occur.

### **VI. Environmental Protection**

**IN CASE OF SPILLS OR LEAKS:** Wear protective clothing as described in Section VII (Personal Protection and Precautions) of this MSDS. Absorb liquid with material such as clay, sand, sawdust, or dirt. Sweep up and place in a suitable container for disposal and label the contents. Area can be washed down with a suitable solution of bleach or soda ash and an appropriate alcohol (methanol, ethanol, or isopropanol). Follow this by washing with a strong soap and water solution. Absorb any excess liquid as indicated above, and add to the disposal container. Keep product, contaminated materials and wash water out of streams and sewers. Wash exposed body areas thoroughly after handling.



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**DISPOSAL METHOD:** Do not contaminate food, feed, or water by storage or cleaning of equipment. Wastes resulting from the use of this product may be disposed of on site, if approved waste handling facilities are available, or at an approved waste handling facility.

**PHYSICAL ENVIRONMENTAL PROPERTIES:** In soil, permethrin is stable over a wide range of pH values. Due to its high affinity for organic matter, ( $K_{oc} = 86,000$ ), there is little potential for movement in soil or entry into ground water. Permethrin has a Log Pow of 6.1, but a low potential to bioconcentrate ( $BCF = 500$ ) due to the ease with which it is metabolized. Piperonyl butoxide is reported to have a maximum half-life of 4.3 days in soil and from 0.55 to 1.64 days in aqueous environments. Gravitational settling remove piperonyl butoxide released in the atmosphere as an aerosol. Gaseous piperonyl butoxide degrades in the atmosphere with an estimated half-life of 3.4 hours. It is reported that piperonyl butoxide has a low potential for environmental bioconcentration.

**ENVIRONMENTAL TOXICOLOGY:** Permethrin is highly toxic to fish ( $LC_{50} = 0.5 \mu\text{g/L}$  to  $315 \mu\text{g/L}$ ) and aquatic invertebrates ( $LC_{50} = 0.02 \mu\text{g/L}$  to  $7.6 \mu\text{g/L}$ ). Marine species are often more sensitive than the freshwater species. Bacteria, algae, mollusks, and amphibians are much more tolerant of permethrin than the fish and arthropods. Care should be taken to avoid contamination of the aquatic environment. Permethrin is slightly toxic to birds and oral  $LD_{50}$  values are greater than 3,600 mg/kg. Longer dietary studies showed that concentrations of up to 500 ppm in the diet had no effect on bird reproduction. Piperonyl butoxide is acutely toxic to fish ( $LC_{50} = 3.94 \text{ mg/L}$  to  $6.12 \text{ mg/L}$ ) and highly toxic to aquatic invertebrates ( $LC_{50} = 0.23 \text{ mg/L}$  to  $0.51 \text{ mg/L}$ ). Care should be taken to avoid contamination of aquatic environments. Piperonyl butoxide has a low to very low toxicity to birds with an acute oral  $LD_{50}$  greater than 2,250 mg/kg and longer-term dietary studies at  $LC_{50}$  values greater than 5,620 ppm.

## VII. Personal Protection and Precautions

### EXPOSURE GUIDELINE(S):

Permethrin	None established.
Piperonyl Butoxide	None established
Petroleum Distillate	5 mg/m <sup>3</sup> (oil mist).

**VENTILATION:** Provide general and/or local exhaust ventilation to control airborne levels below the exposure guideline. Ventilate all transport vehicles prior to unloading.

**RESPIRATORY PROTECTION:** Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection should be needed; however, if the exposure guideline is exceeded, use an air-purifying respirator approved for pesticides (U.S. NIOSH/MSHA, EU CEN, or comparable certification organization).

**EYE/FACE PROTECTION:** Use chemical protective goggles or a face shield.



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**SKIN PROTECTION:** Wear coveralls or long-sleeved shirt and long pants, chemical protective gloves (nitrile, neoprene, or Viton® brand), head covering and shoes plus socks. For increased exposures, wear a full body cover barrier suit, such as a PVC rain suit. Contaminated leather articles, such as shoes, belts, and watchbands, should be removed and destroyed. Launder all work clothing before reuse. Keep work clothing separated from household laundry.

**SPECIAL PRECAUTIONS FOR HANDLING AND STORAGE:** See product label. Harmful if swallowed, inhaled, or absorbed through the skin. Do not get in eyes, on skin, or on clothing. Wash thoroughly with soap and water after handling and before eating or smoking. Avoid breathing dust vapor, or spray mist. Store in a cool, dry place and away from heat. Keep out of reach of children and animals. Keep away from food, feedstuffs, and water supplies.

#### **VIII. DOT Hazardous Materials Information**

**U.S. SURFACE FREIGHT CLASS:** Insecticide, NOI, other than Poison. NMFC Item 102120.

**MARINE POLLUTANT #1:** permethrin (Severe Marine Pollutant).

**OTHER SHIPPING INFORMATION:** This product is not regulated for transport in the USA when shipped via highway or railroad in non-bulk packages. Describe using the "U.S. Surface Freight Class" above, which applies in all cases.

\* \* \* \* \*

**SPECIAL NOTE:** The following applies to water and air shipments, and shipments in bulk packages:

**PROPER SHIPPING NAME:** Environmentally hazardous substance, liquid, n.o.s. (permethrin)

**HAZARD CLASS OR DIVISION:** 9

**IDENTIFICATION NUMBER:** UN 3082

**PACKING GROUP:** III

**OTHER:** NAERG Guide 171



## IX. Regulatory Information

**SARA 313 INFORMATION:** This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
Permethrin	52645-53-1	4.6%
Piperonyl Butoxide	51-03-5	4.6%

**SARA HAZARD CATEGORY:** This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- An immediate health hazard
- A delayed health hazard

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**TOXIC SUBSTANCES CONTROL ACT (TSCA):** All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

**OSHA HAZARD COMMUNICATION STANDARD:** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:**

Category	Rating
Health	1
Flammability	1
Reactivity	0

**COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):** This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name	CAS Number	RQ	% in Product
Permethrin	52645-53-1	not listed	4.6%
Piperonyl Butoxide	51-03-6	not listed	4.6%
Petroleum Distillate	64741-89-5	not listed	90.8%



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Issue Date: June 24, 2003  
Revision Date: August 27, 2008  
May 8, 2009  
November 10, 2009

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not "Hazardous" per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state, and local laws and regulations. See MSDS for health and safety information.

# MASTERLINE KONTROL 4 – 4

## For Mosquitoes, Flies and Gnats

A Quick Knockdown, Low Odor, Non-Corrosive Synergized Synthetic Pyrethroid  
for the Control of Adult Mosquitoes in Residential, Recreational, and Other Areas.  
Also for Use Against Biting and Non-Biting Midge and Black Flies

For use only by federal, state, tribal, or local governmental officials responsible for public health or vector control,  
or by persons certified in the appropriate category or otherwise authorized by the state or tribal lead pesticide  
regulatory agency to perform adult mosquito control applications, or by persons under their direct supervision.

**ACTIVE INGREDIENTS:**

<b>Permethrin</b> (3-phenoxyphenyl)methyl(+-)Cis/trans 3-(2,2-dichloroethenyl) 2,2-Dimethyl cyclopropanecarboxylate.....	4.6%
<b>Piperonyl Butoxide Technical</b> Equivalent to 80% (butylcarbityl)(6-propylpiperonyl) ether and 20% related compounds.....	4.6%
<b>INERT INGREDIENTS:</b> .....	<u>90.8%</u>
Contains a Petroleum Distillate Solvent	
	TOTAL.....

Contains 0.3344 pounds of Permethrin and 0.3344 pounds of Piperonyl Butoxide per gallon.

### KEEP OUT OF REACH OF CHILDREN **CAUTION**

See Side Panel For Additional Precautionary Statements.

**“PRECAUCION AL USUARIO:** Si usted no lee ingles, no use este producto hasta que la etiqueta haya sido explicado ampliamente”

<b>First Aid</b>	
If Swallowed:	Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.
If on Skin or Clothing:	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 – 20 minutes. Call a poison control center or doctor for treatment advice.
If in Eyes:	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
If Inhaled:	Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
Note to Physician: Contains petroleum distillate – vomiting may cause aspiration pneumonia.	

NET CONTENTS:

2.5 GAL \_\_\_\_\_ 30 GAL \_\_\_\_\_ 55 GAL \_\_\_\_\_ 275 GAL\_\_\_\_\_

## **PRECAUTIONARY STATEMENTS**

### **HAZARDS TO DOMESTIC ANIMALS AND HUMANS**

**Caution:** Causes moderate eye irritation. Harmful if swallowed. Avoid contact with skin, eyes or clothing. Avoid breathing vapors or spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove contaminated clothing and wash before reuse. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

### **ENVIRONMENTAL HAZARDS**

This pesticide is extremely toxic to aquatic organisms, including fish and aquatic invertebrates. Runoff from treated areas or deposition of spray droplets into a body of water may be hazardous to fish and aquatic invertebrates. This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the area, except when applications are made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence or disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

Do not apply over bodies of water (lakes, rivers, permanent streams, natural ponds, commercial fish ponds, swamps, marshes or estuaries), except when necessary to target areas where adult mosquitoes are present, and weather conditions will facilitate movement of applied material away from the water in order to minimize incidental deposition into the water body. Do not contaminate bodies of water when disposing of equipment rinsate or washwaters.

### **PHYSICAL AND CHEMICAL HAZARDS**

Do not use, pour, spill or store near heat or open flame.

### **DIRECTIONS FOR USE**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**Note:** Before making the first application in a season, it is advisable to consult with the state or tribal agency with primary responsibility for pesticide regulation to determine if other regulatory requirements exist.

### **STORAGE AND DISPOSAL**

Do not contaminate water, food or feed by storage or disposal.

**Pesticide Storage and Spill Procedures:** Store upright at room temperature. Avoid exposure to extreme temperatures. In case of spill or leakage, soak up with an absorbent material such as sand, sawdust, earth, fuller's earth, etc. Dispose of with chemical waste.

**Pesticide Disposal:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal:** (Metal) Triple rinse or equivalent. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or by other approved State and local procedures. (Plastic) Triple rinse or equivalent. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**Container Disposal for Refillable Containers:** Replace the dry disconnect cap, if applicable, and seal all openings which have been opened during use.

### **BULK STORAGE AND DISPOSAL**

#### **AGITATE BEFORE USE**

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.

**Storage:** Ground water contamination may be reduced by diking and flooring of permanent liquid bulk storage sites with an impermeable material.

**Pesticide Disposal:** Pesticide spray mixture or rinsate that cannot be used according to label instructions must be disposed of according to Federal and local procedures under Subtitle C or the Resource Conservation and Recovery Act.

## **CONDITIONS AND RATES TO USE FOR MOSQUITO CONTROL**

**KONTROL 4-4** may be applied either diluted or undiluted as a thermal or non-thermal fog. Applicators should wear long sleeved shirt, long pants, shoes and socks.

**KONTROL 4-4** is recommended for application in ultra low volume (ULV) non-thermal aerosol (cold fog) to control adult mosquitoes, flies and gnats in residential and recreational areas where these insects are a problem, such as, but not limited to parks, campsites, woodlands, athletic fields, golf courses, residential areas, municipalities, gardens, playgrounds, recreational areas and overgrown waste areas. For best results, treat when insects are most active and conditions are conducive to keeping the fog close to the ground.

Both ground and aerial applications should be made when meteorological conditions are conducive to keeping the spray cloud close to the ground, such as when an air temperature inversion is present. Applications during the cool hours of early morning or evening are preferable. Air temperatures should be greater than 50° F when conducting all types of applications. Application in calm air conditions is to be avoided. Apply only when ground wind speed is greater than 1 mph. Do not apply when wind speed exceed 10 mph. Applications cannot exceed the recommended rates.

Do not re-treat a site more than once 12 hours. Do not apply more than 0.18 lbs. of permethrin per acre per year to any site. More frequent treatments may be made to prevent or control a threat to public and/or animal health determined by a state, tribal or local health or vector control agency on the basis of documented evidence of disease causing agents in vector mosquitoes or the occurrence of mosquito-borne disease in animal or human populations, or if specifically approved by the state or tribe during a natural disaster recovery effort.

**KONTROL 4-4** can be applied over specific growing crops and range grasses prior to harvest for the control of adult mosquitoes and biting flies within or adjacent to these areas. Application can only be made where the following crops are present:

Alfalfa	Range Grasses
Almonds	Horseradish
Apples	Kiwifruit
Artichoke, globe	Leafy Vegetables (except Brassica)
Asparagus	Lettuce, head
Avocado	Mushrooms
Broccoli	Onion, dry bulb
Brussels Sprouts	Peaches
Cabbage	Pears
Celery Cauliflower	Pepper, bell
Cherries	Pistachio
Corn, fodder	Potato
Corn, forage	Soybeans
Corn, grain (field and pop)	Spinach
Corn, stover	Tomatoes
Corn, sweet kernel plus cob with husks removed	Vegetable, cucurbits
Eggplant	Walnuts
Filbert	Watercress
Garlic	

In the treatment of corrals, feedlots, animal confinements/houses, swine lots, poultry ranges and zoos, cover any exposed drinking water, drinking fountains and animal feed before application. Do not contaminate non-approved sites with spray drift.

## GROUND APPLICATION INSTRUCTIONS (Thermal and Non-Thermal Application)

**DROPLET SIZE CALIBRATION FOR GROUND APPLICATION EQUIPMENT:** Spray equipment must be adjusted so that the volume median diameter is less than 30 microns ( $D_v 0.5 < 30 \mu\text{m}$ ) and that 90% of the spray is contained in droplets smaller than 48 microns ( $D_v 0.9 < 48 \mu\text{m}$ ). Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

### THERMAL AEROSOL FOGGING

**TRUCK MOUNTED:** Apply diluted or undiluted with suitable Thermal Fogging equipment. Do not exceed the maximum a.i./acre rates. May be applied at speeds of 5 to 20 mph, treating a 300 ft. swath. To reduce oil requirement and sludge buildup in equipment, use a suitable mineral oil of 60 – 100 second viscosity. For use with hand foggers, use the same a.i./acre rates and a swath width of 50 ft with a walking speed of 2 mph. Do not wet foliage since the oil base formulation may be phytotoxic. Do not fog when wind conditions exceed 10 miles per hour. Use well maintained and properly calibrated fogger.

#### Suggested Dilution Rates to Achieve 0.00175# a.i. per Acre

			HAND HELD THERMAL FOGGERS 50 FT SWATH AT 2 MPH 0.00318# A.I. PER ACRE	
MACHINE OUTPUT GAL/HOUR	DILUTION RATIO WITH FOG OIL 5MPH	DILUTION RATIO WITH FOG OIL 10 MPH	MACHINE OUTPUT	DILUTION RATE
10 gal/hr	1 : 9.5	1 : 4.25	0.25 gal/hr	1 : 1.2
20 gal/hr	1 : 20	1 : 9.5	2.0 gal/hr	1 : 16.4
30 gal hr	1 : 30	1 : 14.75	5.0 gal/hr	1 : 42.4
			8.0 gal/hr	1 : 68.4

### NON-THERMAL AEROSOL (COLD FOG)

**KONTROL 4 – 4 ULV Non-Thermal Aerosol (cold fog) Application:** To control mosquitoes, midges and blackflies, apply **KONTROL 4 – 4** using any standard ULV ground applicator capable of producing a non-thermal aerosol spray. Apply the product at a flow rate of 4.1 to 16.2 ounces per minute at an average vehicle speed of 10 mph. If different vehicle speed is used, adjust the rate accordingly. These rates are equivalent to 0.00175 to 0.007 pounds of permethrin and the same amount of 0.00175 to 0.007 pounds of synergist piperonyl butoxide per acre. Vary flow rates accordingly to vegetation density and mosquito population. Use higher flow rates in heavy vegetation or when populations are high. An accurate flow control system must be used to ensure proper flow rate. **KONTROL 4 – 4** may also be applied by diluting with a suitable solvent such as mineral oil and applying so as not to exceed the maximum pounds of active ingredient per acre as shown in the first column of the ULV table shown below. That table represents some suggested application rates for ground ULV applications. If an alternative dilution rate is used, adjust the flow rate accordingly.

#### Conditions and Rates to use KONTROL 4 – 4 Undiluted for Mosquito Control

PERMETHRIN/PBO LBS. A.I./ACRE	APPLICATION RATES/FLUID OUNCES TO USE PER MINUTE			
	5 mph	10 mph	15 mph	20 mph
0.007/0.007	8.1	16.2	24.4	32.5
0.0035/0.0035	4.0	8.1	12.2	16.2
0.00175/0.00175	2.0	4.1	6.1	8.2

### AS A BARRIER SPRAY USING A MISTER TYPE UNIT

For use in non-thermal equipment, apply **KONTROL 4 - 4** with a mist blower adjusted to deliver droplets with a volume median diameter of 50 – 120 $\mu\text{m}$ . Use undiluted or diluted to achieve an application of 0.00175 / 0.00175 # a.i./acre. Use a 50 ft (15.2m) swath while walking at a speed of 2 mph (3.2 kph). If using a different speed, swath or dilution, do not exceed the maximum a.i./acre. When this product is applied as a barrier treatment, do not apply within 100 feet (30 meters) of lakes and streams.

### **AERIAL APPLICATION INSTRUCTIONS**

The use of aircraft specially equipped and capable of applying ULTRA LOW VOLUMES of **KONTROL 4-4** may be necessary.

**DROPLET SIZE CALIBRATION FOR AERIAL APPLICATION EQUIPMENT:** Spray equipment must be adjusted so that the volume median diameter produced is less than 60 microns ( $D_v 0.5 < 60 \mu\text{m}$ ) and that 90% of the spray is contained in droplets smaller than 115 microns ( $D_v 0.9 < 115 \mu\text{m}$ ). The effects of flight speed and, for non-rotary nozzles, nozzle angle on the droplet size spectrum must be considered. Directions from the equipment manufacturer or vendor, pesticide registrant or a test facility using a wind tunnel and laser-based measurement instrument must be used to adjust equipment to produce acceptable droplet size spectra. Application equipment must be tested at least annually to confirm that pressure at the nozzle and nozzle flow rate(s) are properly calibrated.

Aerial application shall be made at altitudes ranging from 75 to 300 feet. Fixed wing aircraft with flat fan or rotary nozzles, or rotary wing aircraft equipped with rotary nozzles, apply at a sufficient airspeed to deliver the appropriate amount of a.i./acre (from 0.00175 to 0.007 # a.i./acre) and to achieve the appropriate droplet range. Apply only when ground wind speed is greater than 1 mph.

**PROHIBITION FOR AERIAL USE:** Not for aerial application in Florida unless specifically authorized by the Bureau of Entomology and Pest Control, Florida Department of Agriculture and Consumer Services.

**NOTICE:** Buyer and user assume all risks and liability of use, storage and/or handling of this product not in accordance with the terms of this label.

### **BUYER GUARANTEE LIMITED TO LABEL CLAIMS**

Univar USA, Inc.  
11149 Research Blvd., Suite 260  
Austin, Texas 78759

EPA Registration No. 73748-4  
EPA Establishment No. 53883-TX-002



## **APPENDIX C**

### **INNOVATIVE READINESS TRAINING REQUEST FOR MILITARY ASSISTANCE**



**Office of the Assistant Secretary of Defense  
Reserve Affairs  
1500 Defense Pentagon  
Washington, DC 20301-1500**

**INNOVATIVE READINESS TRAINING  
REQUEST FOR MILITARY ASSISTANCE**

This application is to be used by all civil organizations or governmental agencies requesting Civil-Military Innovative Readiness Training (IRT) support as authorized by section 2012 of Title 10, United States Code. Applications are to be mailed to:

OASD/Reserve Affairs  
Attn: IRT Director  
1500 Defense, Pentagon  
Room 2E573  
Washington, DC 20301-1500

All IRT applications for support will be reviewed for completeness and eligibility. The applications will be forwarded to the Service IRT Program Managers and the Services will review the projects for unit and individual training opportunities. The Services will forward a request to support the project to the Office of the Assistant Secretary of Defense for Reserve Affairs (OASD/RA) for final review and approval. It is imperative that the information provided by the requesting official(s) be accurate and complete. A requesting official is an individual who submits the request and can sign contracts or commit funds and resources on behalf of the requesting organization. Specific information related to medical (Attachment A), engineering (Attachment B), and transportation and dive (Attachment C) projects must be included with this application. Complete the additional documents as appropriate for the project. Any additional letters, documents, maps that would provide more information or details to the proposed project also should be attached to the application as appropriate. Any request for support that will exceed one year must submit an annual request for military participation with all supporting documentation.

Please include copies of documents listed below with this application:

1. 501 C3 letter- required for non-profit organization request, must not be more than 10 years old
2. Articles of Incorporation
3. By-laws
4. Copy of newspaper ads which were published twice on two separate dates. State/Federal/local government entity to use their required process to advertise for this project; ie: advertisement in FedBizOpps or contract ads. Ad must be published annually for the length of the project.
5. Affidavit of publication (annual requirement for the length of the project)
6. Environmental study if appropriate
7. Statement of non-competition (Attachment D)
8. Release of liability (Attachment E)

**The execution of any approved IRT project is contingent upon the availability of funding and DoD resources.**

1. Name of community, agency, State or Federal entity requesting military support:

??? (County Mosquito Control Division)

1a. Is the requesting agency/organization a military entity, either State or Federal, active, reserve or Guard?

Yes \_\_\_\_\_ No  X \_\_\_\_\_

1b. Is the requester a non-profit organization or entity other than city, state, federal entity?

Yes \_\_\_\_\_ No  X \_\_\_\_\_

If the answer is yes, attach a copy of the articles of incorporation, 501C3 letter, and organization by-laws with this application.

2. Address of requesting organization:

???????????

???????????

City

State

Zip

3. Provide a short description of the request for your project. Medical projects require Attachment A; Aerial Spray projects require Attachment B and transportation/dive projects require Attachment C.

??? (county/city) in (State) is a/an (????) environment supporting excessive development of mosquito populations. ??? (County/City) aerially applies larvacide/adulticide pesticides when surveillance methods used by the district indicate high levels of mosquito activity exceeding threshold minimums. Requesting aerial application of pesticides over the large land area of ??? (County/City) using the USAFR C-130 MASS.

3a. Will this project take place at a location different from the address listed above?

Yes  X \_\_\_\_\_ No \_\_\_\_\_ If yes, include address in block below.

Variety of areas located throughout the County/City of ??? (Ensure all areas are specified in the EA)

City

State

Zip

4. Will this project take place on a state or federal military installation, post, fort, base or other facility or property operated/leased/owned by or housing a federal or state military service or component?

Yes  No

\*Spray operations will stage out of (???? Air Base), however, the spray will be supporting the County/City of (????).

5. Information for requesting official submitting request for support:

Name:
Title:
Phone number:
Email address:
I have authority to enter into a binding agreement/MOU/MOA on behalf of the agency I represent: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
I have authority to commit resources or funds on behalf of the agency I represent: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

6. Check which community facilities are available (at no expense) for use by military during the project.

Guard armory	city hall offices	community center	airfield hangar	clinic	school	office trailers
--------------	-------------------	------------------	-----------------	--------	--------	-----------------

Other: No areas would be needed within the community due to operating out of ??? AFB.  
If any areas will be needed, please indicate.

7. What contributions or resources will be provided by the requesting organization to assist this proposed IRT project? Place an "x" next to each that applies.

Pesticide	EPA Permits	
Hazardous Waste Disposal	FAA Congested Area Plan	
Mosquito Collection/Monitoring		

7a. Other assistance/financial/facilities provided by the requesting agency/community:

(County/City) will purchase and provide pesticide used for application over the designated spray areas and the disposal of any hazardous wastes generated as a result of the operation.  
(County/City) Mosquito Control Division will perform pre- and post- spray mosquito population monitoring and assessments, as well as accomplish all NEPDES permitting measures to fulfill all requirements set forth by the EPA for pesticide applications.  
(County/City) will accomplish the congested area plan with the controlling FSDO for low level applications over the congested areas of the (county/city).

8. What other funding/support is being contributed to this project?

Fed/State/Local/Private	Department	Amount of funding Requested	Amount of actual appropriated funds/date appropriated
Example- Federal	Dept of Transportation	\$1,000,000	\$500,000 1 Oct 2008
If applicable, please list.			

9. Specify and explain three prioritized time frames for the requested IRT support.

TIME FRAME	REASON FOR SPECIFIC TIME PERIOD
October 12-October 13	During peak periods for mosquito populations in (State/County)

10. Describe any special events/holidays/activities/ or local issues that may be ongoing during the project period. Include any situations that the military should be aware of that may impact their activities in the community.

None (unless known or planned to be a factor then provide a listing)

11. What is the projected length of time needed to complete this project (describe all phases)?

The project will be an annually requested project typically requiring #(i.e. 5) applications during the peak mosquito season. Each application may take up to #(i.e. 5) spraying days to treat all desired areas within the county. Applications will require pre-spray assessment, pesticide applications, and post spray population assessments following the aerial pesticide applications.

(Please ensure the number of applications is in accordance with the amounts specified in the EA)

12. Federal, state, city **Aerial Spray project:** - has this project been listed on the federal/state/county/city websites for aerial spray projects and advertised according to federal/state/county/city contract law or the contract bid process? Yes  No \_\_\_\_\_  
If no, please attach an explanation to why this process was not completed.

**All projects-** Please include the public notice ads that were placed in the newspaper for the minimum state required time for public notices

**Attach a copy of the ads and notarized affidavit stating the ads were published and what was the response to the ads.**

12a.

Place of advertisement	Date advertised
??	??
??	??

13. Is the requested support available from a commercial entity? Yes  No \_\_\_\_\_  
A negative response means there are no contractors or companies in the area/community of the project that conduct this type of business.

13a. If services are available from a commercial entity, has the official submitting this request received a "certificate of non-competition" from the commercial entity that would otherwise provide such services? Yes  No \_\_\_\_\_

If applicable, attach a copy of the "certification of non-competition".

14. Has this project been presented to any of the following entities: provide name beneath title if applicable.

US Senator	Governor	State Senator	City Mayor
US Congressman	State TAG	State Representative	other

15. Remarks (attach additional sheet if necessary)

\_\_\_\_\_  
Printed name of requesting official/civil authority

\_\_\_\_\_  
Signature of requesting official/civil authority

Date: \_\_\_\_\_

Mail application to:  
OASD/Reserve Affairs  
Attn: IRT Director  
1500 Defense, Pentagon  
Room 2E573  
Washington, DC 20301-1500

## **Attachment A**

### **Medical Support Request**

**The Civilian Health Organization (CHO) or community/city/state/federal entity shall conform to all applicable federal, state, and local laws that regulate healthcare delivery within the state or territory, and all state laws and regulations specific to the non-DoD healthcare professionals participating.**

1. Identify the CHO supervisor overseeing the medical project:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Email: \_\_\_\_\_  
Phone: \_\_\_\_\_

2. The CHO/community/city/state/federal entity verifies and documents who will be the responsible individual at each location as follows:

Medical waste handling and disposal	Name:  Email:
Clinical Laboratory Improvement Act (CLIA)	Name;  Email:
Credentialing or privileging or military health care providers to include basic life support, and if applicable, advance trauma/cardiac requirements (strictest requirement applies)	Name:  Email:
Initial emergency evacuation plan for a “real life incident”	Name;  Email:
Follow-up care plan for patients for continuity of care	Name;  Email:
Plan for handling of patients’ records for continuity of care and privacy act issues	Name:  Email:

3. List the communities in which this project is expected to take place. Additional space is provided at the end of this attachment.

Community	Nearest City	State	Population	Most needed medical support (dental, medical, optometry, veterinary, behavioral health) Use initials D, M, O, V, B for each need in the community.
a.				
b.				
c.				
d.				
e.				
f.				

4. Closest medical treatment facility with trauma/emergency room:

Name/location: \_\_\_\_\_

5. The CHO shall certify that this medical project:

a. Accommodates an identified underserved healthcare need that is not being met by current public or private sector assistance. Please provide a description of the criteria used to identify the medically underserved community.



6. Please place an "X" beside each specialty service that is requested: this is a preliminary request that can be updated at the initial project planning conference. Blank space for other specialties not listed.

Projected case load	Projected case load
General dentistry	Rheumatology
Oral surgery	Family practice
Pediatric dentistry	Ob-Gyn
Endodontist	Physician Assistants
Periodontist	Nurse practitioners
Dental hygienist	Physical therapists
Endocrine	Nutritionists
General dentistry	Behavior health
Oral surgery	Ob-Gyn
Family practice	Physician Assistants
Pediatrics	Optometry
Internists	Eye glasses
Surgeons	Veterinary
Anesthesiology	CPR certification
Colonoscopy	Drug demand reduction
Colposcopy	

7. Have any of the communities stated in the previous section ever received past medical support from the military? If so, state which community, what type of support, when it occurred and the length of time the military was in the community.

M= medical D= dental V= veterinary O= optometry B= behavioral health

Community	Type of support	Dates of medical support	Length of time in the community
a.			
b.			
c.			
d.			
e.			

8. Additional Comments or medical support requests:

9. The CHO shall certify that this medical project is provided in a manner that does not compete with private sector medical/dental/heathcare assistance in the underserved area.

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

## **Attachment B**

### **Engineering Projects: Aerial Spray**

1.

Location: (County/City)
Type of project: Vector control
Description of project: (County/City) mosquito populations create health and nuisance problems for all the people living in (State). Add any additional information to justify you feel is necessary
USAFR C-130 MASS can treat large areas of the county in a short period of time. Control measures will typically require up to ?? days to treat all affected areas of the county. Based on past mosquito activity, the county would typically use around ?? applications per spray season. Application dates and times will vary depending upon the pest populations.

2. Project specifics: other items already completed should be added to the list or attached as addendums to this application.

Descriptive requirements	Completed by requesting entity- on file and submitted with this request	Date completed	Date to be completed	Not applicable
Environmental study	??			
NEPDES permits	??			
FAA Congest Area Plan	??			

3. Please place an "X" beside each service that is anticipated to be needed in completing this project: this is an initial estimate of the work to be done. The military will assess the project and make assignments as needed at the initial planning conference.

C-130 Aircrew		
Aerial Spray Mx		
C-130 Mx Support		
Entomologists		

4. Has your organization ever received past aerial spray IRT support from the military? If so, state which community, what type of support, when it occurred and the length of time the military was in the community.

Community	Type of support – brief project description	Dates of engineering support	Length of time in the community
a.			
b.			
c.			

5.

Additional Comments:

No support for mosquito control has been accomplished under IRT. The 910AW/757AS has provided USAFR C-130 MASS for applications previously under unit training operations but changes to operating procedures is requiring these missions to start coordinating through the IRT program.

## **Attachment C**

### **Transportation/Dive Projects**

1. General transportation or diving requests: Describe the transportation or diving request. Additional comments can be attached to this document.

2. Diving projects: annotate availability of the below items:

Mooring permits	Pier permits
Access to fuel from pier	Is USCG aware of project? Yes <input type="checkbox"/> No <input type="checkbox"/>
City/community permits	Equipment storage facility
Parking	Source of power/electricity
Potable water source	Meeting room/office space

3. Describe any other transportation or diving issues not addressed in the previous two questions.

## **Attachment D**

### **Statement of Non-Competition**

The Innovative Readiness Training (IRT) Project for Aerial Spray (name of project)

located in \_\_\_\_\_ (county) \_\_\_\_\_ (state) for Fiscal Year 2013, would not compete with the services offered by civilian companies/vendors/entities or private providers. For the reasons set forth below the requested IRT assistance is not reasonably available from a commercial entity. I have made inquiries on behalf of my organization and have found that, while there are commercial entities in the local geographic area which perform such work, my organization does not have sufficient financial resources to pay for such work. Therefore, these applications will not be performed with the assistance from the U.S. Air Force Reserve.

On two occasions, (date) \_\_\_\_\_ and (date) \_\_\_\_\_ an advertisement for the services/project to be performed by the military has been advertised in (name of publication) \_\_\_\_\_ consistent with the requirements of the IRT Program and the rules, if any, of the requesting organization. Copies of each advertisement are attached to the application.

No responses have been received by the designated deadline specified in the advertisements, and this organization has received no objection to the military participation in this project.

Printed Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Organization: \_\_\_\_\_

Phone: \_\_\_\_\_

Date: \_\_\_\_\_

## **Attachment E**

### **RELEASE AND HOLD HARMLESS AGREEMENT**

The \_\_\_\_\_ (name of requesting

organization) located in \_\_\_\_\_ (city/state)

agrees that its request that DoD military personnel conduct an Innovative Readiness Training (IRT) mission in support of \_\_\_\_\_ (organization) during fiscal year 2013 is subject to the following conditions:

1. The DoD IRT military support will be limited to that which is approved by the Department of Defense. Support that has not been previously approved will not be provided; IRT mission personnel may not perform activities beyond those previously approved.
2. Support shall be limited to providing personnel and equipment only.
3. All DoD military personnel and equipment will remain under the control and supervision of the officer or noncommissioned officer responsible for the military unit tasked to provide the IRT support.

The \_\_\_\_\_ (name of the requesting organization), in exchange for the DoD IRT military support, also agrees, on behalf of itself and its agents, to:

1. Release the DoD, its subordinate units, its officers, military personnel, employees, agents, and servants from any claim, demand, action, liability, or suit of any nature whatsoever for or on account of any injury, loss, or damage to the requesting organization and its agents arising from or in any way connected with the DoD military personnel support, excluding, however, any injury, loss, or damage arising solely from the intentional torts or gross negligence of the DoD military personnel or its agents.
2. Hold harmless the DoD, its subordinate units, officers, military personnel, employees, agents, and servants from any claim, demand, action, liability, or suit of any nature whatsoever for or on account of any injury, loss, or damage to any third person or third person's property arising from or in any way connected with the DoD IRT military support, excluding, however, those arising solely from the intentional torts or gross negligence of the DoD military personnel or its agents.

With full understanding of the conditions and agreements stated above, the undersigned representative, who is authorized to execute this document which is binding on his organization and all assigns, heirs, executors, beneficiaries, and derivative claimants, hereby executes this release of liability and hold harmless agreement.

Printed name: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Organization: \_\_\_\_\_